

# **Horry County Stormwater Management Design Manual**



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# CHAPTER 1

## 1. GENERAL INFORMATION

### 1.1. Purpose

Horry County has developed this Manual and the Stormwater Management Ordinance (Ordinance) to protect, maintain, and enhance water quality and the environment of the County and the short-term and long-term public health, safety, and general welfare of its citizens. This Manual and the Ordinance are also designed to minimize property damage by establishing requirements and procedures to control the potential adverse effects of increased stormwater runoff and related pollutant loads associated with both future development and existing developed land. Proper management of stormwater runoff will ensure a functional drainage system, reduce the effects of development on land and stream channel erosion, attain and maintain water quality standards, enhance the local environment associated with the drainage system, reduce local flooding, maintain where necessary pre-developed runoff characteristics of the area in terms of flow rate, volume and pollutant concentration, and facilitate economic development while mitigating associated pollutant, flooding, erosion, and drainage impacts.

This Manual is for stormwater management purposes only, and the requirements herein are specific to the Horry County Stormwater Management Program and do not preclude other county departments (i.e. the Planning and Zoning Department) from performing their permit, plan review, inspection or other related duties and collecting applicable fees.

This Manual describes the policies and procedures used by the Stormwater Department to implement the Ordinance and the County's Stormwater Management Plan (SWMP). These standards and procedures will:

1. Describe the construction activity application requirements and approval process as it relates to stormwater management;
2. Convey the technical design standards to the engineering community, to include standards which address runoff flow rates, volumes, and pollutant load/concentration, as well as specific standards during construction, and post-construction for long-term performance;
3. Provide information on avenues to improve water quality, prevent illicit discharges, and minimize stormwater runoff impacts due to development and re-development;
4. Convey other protection provisions related to stormwater discharges such as wetlands and watercourse conservation;

Every effort has been made throughout this Manual to cover the common conditions and information needed by those involved in construction activities. However, these design standards and the County Ordinances should be reviewed carefully to ensure that all requirements are being met. Developments may also be impacted by applicable state and federal requirements. For projects that require coverage by the South Carolina NPDES General Permit for Stormwater Discharges from Large and Small Construction Activities (CGP) the County will not issue a permit until notice of coverage from the South Carolina Department of Health and Environmental Control (SCDHEC) is received by the Stormwater Management Department.

## 1.2. **Scope**

The scope of this Manual is limited to the requirements related to stormwater management as reviewed and approved by the Horry County Stormwater Department. This Manual is not intended as a textbook or a comprehensive engineering design reference. It was instead developed under the assumption that the user possesses a basic understanding of stormwater control design, construction, or land development depending on the user's particular area of expertise. References to guidance documents from federal, state, and local agencies, as well as commercial products are given throughout this Manual to provide additional information to users. Common examples are the Natural Resources Conservation Service's (NRCS) TR-55, SCDHEC's Best Management Practices (BMP) Manual and Low Impact Development in Coastal South Carolina: A Planning and Design Guide.

The design standards are not intended to restrain or inhibit engineering creativity, freedom of design, or the need for engineering judgment. When shown to be applicable, it is encouraged that new methods, techniques, and innovative stormwater BMPs be submitted with supporting documentation. However, the use of such approaches should be substantiated with submitted documentation by design professionals showing that the proposed design is equal to, or exceeds the traditional procedures in terms of performance and economic feasibility.

On projects that require site specific designs pertaining to stormwater management and water quality, site plans, details, calculations, construction specifications, and other technical documents must be designed and sealed by a professional engineer, landscape architect, or Tier B Land Surveyor who is registered in the State of South Carolina, with sufficient knowledge and experience to accomplish all design elements of the site plan. Users who are not justly qualified by education or experience in the fields of stormwater control design, construction, or land development should consult with a qualified professional in one or more of these areas prior to planning for construction activities.

## 1.3. **Manual Organization**

The design standards are divided into four (4) chapters, organized to present recommended technical and engineering procedures along with criteria obtained from local, state, and federal requirements. The remainder of this chapter provides information on the County's authority to develop and enforce design requirements, some background information on stormwater

management and its importance, and definitions for terms used throughout this Manual. Chapter 2 describes the application process for obtaining a stormwater permit, Chapter 3 contains specific design criteria and Chapter 4 describes the inspection and enforcement process. There are also numerous Appendices including the County's permitting flow chart, permit transfer form, Notice of Intent (NOI) form, permanent maintenance covenants, post-construction maintenance templates and enforcement response plan (ERP).

## **1.4. Authorization**

This Manual has been prepared under the direction of the Stormwater Department, which has been granted the authority to develop engineering design standards and enact programs, policies and procedures to ensure compliance with state and federal laws for the purposes described above. Description of stormwater related laws, regulations, and assigned authorizations to Horry County are provided below.

### **1.4.1. Clean Water Act**

The Federal Water Pollution Control Act, as amended by the Clean Water Act (CWA) requires the reduction of water pollution and gave the Environmental Protection Agency (EPA) the congressional authority to develop programs to improve the health of navigable waters. The EPA in response developed regulations that created a program of discharge permits as part of the National Pollutant Discharge Elimination System (NPDES) Permit to regulate point sources from a variety of discharges. The 1987 amendments to the CWA extended NPDES permits to industrial discharges, including stormwater runoff associated with land disturbing activity. The 1987 CWA Amendments also require NPDES permitting for stormwater runoff from urbanized areas. A municipal separate storm sewer system (MS4) NPDES permit is required based on population. Authority to administer the NPDES permit program was delegated to state agencies, such as SCDHEC, by the EPA.

### **1.4.2. South Carolina Pollution Control Act**

The South Carolina Pollution Control Act (PCA) was originally enacted in 1950 and was last amended in 1970. It was written very broadly and is applicable to essentially any activity that could negatively impact the environment by requiring attainment of a permit and implementation of measures to mitigate potential impacts.

### **1.4.3. South Carolina Stormwater Management and Sediment Reduction Act**

The South Carolina Stormwater Management and Sediment Reduction Act and corresponding regulations (R. 72-300) were enacted to address the increase in stormwater runoff rate and quantity, the decrease of rainwater infiltration, and the increase in erosion associated with the extensive urban development occurring throughout the state. The Act gave legislative authority to SCDHEC to enact programs to meet its purpose.



#### **1.4.4. NPDES Permit for Stormwater Discharges Associated with Industrial Activity**

All stormwater runoff from “industrial activities” as defined by the EPA, is considered an illegal discharge without NPDES discharge permit coverage. These permits require certain industries and construction activities (covered under SCR100000) to develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which must include appropriate BMPs to minimize pollution to the receiving natural waterbodies.

#### **1.4.5. NPDES MS4 General Permit SCR0300000**

Horry County is an MS4 community regulated by the provisions of the NPDES Phase II Municipal Separate Storm Sewer System (MS4) program. The NPDES MS4 permit requires that Horry County encourage, promote, implement, and enforce certain practices, programs, and procedures for the purpose of reducing or limiting discharge of pollutants to Waters of the State. The permit requires that Horry County develop and implement a Stormwater Management Plan (SWMP) to control the discharge of pollutants from its MS4 to the maximum extent practicable (MEP).

The SWMP has numerous components that must be met and this Manual provides compliance with several, including construction and post-construction management, public education, and enforcement. The SCDHEC MS4 permit can be found at [http://www.scdhec.gov/Environment/docs/Final\\_SMS4\\_Permit.pdf](http://www.scdhec.gov/Environment/docs/Final_SMS4_Permit.pdf)

#### **1.4.6. Horry County Ordinances, Regulations, and Standards**

Horry County has developed and adopted ordinances and standards, largely based on state and federal regulations, specifically to address concerns associated with uncontrolled stormwater runoff. The principal ordinances and standards for the County that affect stormwater control measures are:

1. Stormwater Management Ordinance: Established the requirements and procedures for obtaining a Stormwater permit within Horry County. The Stormwater Department was authorized by this ordinance to develop all necessary regulations, as detailed in this Manual for properly controlling stormwater runoff and mitigating existing and future impacts;
2. Planning and Zoning Ordinance: Issues that may be impacted by this Ordinance when designing stormwater management systems include but are not limited to: limits on building density, buffer and setback requirements, parking lot islands, required parking spaces, tree protection, planting species selection, and screening requirements for ponds and other BMPs. Applicants should specifically check to make sure a desired development type is allowed in the planned location;

3. Flood Damage Prevention and Control Ordinance: This Ordinance applies to all areas of special flood hazard within the jurisdiction of the county. No structure or land shall be located, extended, converted, or structurally altered without full compliance with the terms of this Ordinance and other applicable regulations.

## 1.5. Updates to the Design Standards

This Manual is subject to updates. As design technology and criteria evolve or change, or it becomes evident that additional measures are needed to ensure the public's general welfare, the Manual will be updated as needed. Updates will be approved by the Stormwater Department.

Users of this Manual are encouraged to provide comments on the content of this Manual at any time. This Manual can be found on the Horry County website at <http://stormwater.horrycounty.org>.

## 1.6. Stormwater Management

Development and redevelopment of properties has the potential to alter the natural drainage patterns, flow rates, and volumes, and quality of the County's water resources. The following sections discuss these impacts and the design considerations that are available and encouraged.

### 1.6.1. Urban Stormwater Runoff

This section provides background information on the major sources of pollutants commonly found in stormwater flows and those that impact County waterbodies. In Table 1.1, these sources and the pollutants most commonly associated with them are presented. This is followed by a detailed discussion of the most common pollutants found in stormwater discharges.

#### 1.6.1.1. Suspended Solids

The most prevalent form of stormwater pollution is the presence of suspended matter that is either eroded by stormwater or washed off paved surfaces by stormwater. Suspended solids increase the turbidity of the receiving water, thereby reducing the penetration of light, resulting in decreased activity and growth of photosynthetic organisms. Also, elevated concentrations of suspended sediment alters stream nutrient biogeochemistry which impacts nutrient adsorption and desorption, processes very important to control over primary production and overall ecosystem health (Lee, 1996; Dent and Henry, 1999). The increased turbidity also detracts from the aesthetics of natural waters. In addition, the clogging of fish gills has been attributed to the presence of suspended solids. Combined sewer overflows typically contain high suspended solids concentrations. The solids that settle in the receiving water pose long-term threats resulting from their oxygen demand and gradual accumulation of toxic substances (Moffa, 1990), as well as reducing primary production. Sedimentation and other forms of physical separation are often an effective means of removing suspended solids from stormwater.

**Table 1.1: Typical Stormwater Pollutants and Sources**

Pollutant Source	Pollutants of Concern
<b>Erosion</b>	Sediments and attached soil nutrients (numerous nitrogen and phosphorus forms), organic matter, and other adsorbed pollutants.
<b>Atmospheric Deposition</b>	Hydrocarbons emitted from automobiles, dust, metals, nutrients, and other chemicals released from industrial and commercial activities.
<b>Roadways/Transportation related areas</b>	Hydrocarbons emitted from automobiles, dust, metals,
<b>Construction Sites</b>	Sediment, metals, paint, and wood preservatives.
<b>Manufactured Products (Industrial land uses)</b>	Heavy metals, phenols, and oils from automobiles, Zinc and Cadmium from tire wear.
<b>Lawn and Landscape Maintenance</b>	Fertilizer and pesticides.
<b>Plants and Animals</b>	Plant debris, animal excrement.
<b>Septic Tanks</b>	Coliform bacteria, nitrogen, NO <sub>3</sub> .
<b>Non-Storm Water Connections</b>	Sanitary sewage, industrial wastewater, commercial discharge, and construction activities.
<b>Accidental Spills</b>	Pollutants of concern depend on the nature of the spill.
<b>Animal Waste Management</b>	Coliform bacteria, nitrates, and phosphorus.
<b>Pesticide Applications</b>	Pollutants of concern depend on the pesticide being used and the type of crop or pest being treated.
<b>Land Disturbance Agriculture</b>	Sediment and attached soil nutrients, organic matter, and other adsorbed pollutants.
<b>Fertilizer Applications</b>	Nitrogen and phosphorus.

Source: U.S. Environmental Protection Agency, June 1992.

Sediment is derived from a variety of sources, including erosion from disturbed areas, wash off of sediment deposited on impervious areas, and detachment of sediment due to the increased stream power that comes from increased flow rates and flow durations with urbanization. A significant number of models are available to predict total suspended solids (TSS) contributions from “clean” sediment, but few of the models have parameters specific to urbanized areas. Most of the models were developed to deal with agricultural soils, and their application to urban areas is limited.

Models that do have capabilities that have been used for predicting urban sediment include SWMM, SWAT, and SEDPRO models. For the models to be effectively utilized in sizing BMPs, predictions must be made of time varying quantities as well as the size distribution. Those distributions must be of the aggregated particles, not just the primary particles.

#### 1.6.1.2. **Oxygen Demanding Matter and Bacteria**

Sufficient levels of dissolved oxygen (DO) in the water column are necessary to maintain aquatic life, growth, and reproductive activity, as well as to maintain aerobic conditions. The introduction of stormwater containing oxygen-demanding organic matter can impair the receiving water quality by reducing the DO levels such that it is unable to sustain certain forms of aquatic life and can further cause the water to become foul. Bacteria enter the stormwater drainage systems typically from the wash off of animal feces and organic matter from the catchment surface, possibly even disturbed soil. Bacteria also may enter the stormwater system and ultimately natural waters through leaking sewer systems (lateral connections, manholes, and industrial or commercial drains, etc.) and malfunctioning septic systems, all of which are termed illicit discharges and illegal by the Horry County Stormwater Management Ordinance.

Organic matter, usually in the form of vegetation and detritus, is carried through the conveyance system by stormwater runoff. Pathogenic bacteria and viruses in stormwater discharges pose human health threats. The removal of pathogenic bacteria is achieved primarily through the process of biological decay and physical-chemical disinfection where practiced. Presence of such bacteria is assumed based on the detection of indicator bacteria such as fecal coliform or E-coli. The reduction of bacteria in waters of the state has been the focus of TMDL efforts by SCDHEC to date.

#### 1.6.1.3. **Nutrients**

Nitrogen and phosphorus are plant nutrients that promote the growth of plants and protista, such as algae, and are the second leading stressor of impaired rivers and streams and the leading stressor of impaired lakes (US EPA, 1997). Such nutrients contribute to the eutrophication of water bodies resulting in a list of associated liabilities, such as decreased oxygen supply, alteration of aquatic life, and decreased recreational value (Novotny, 1985).

Nutrients are typically derived from agricultural runoff as well as runoff from chemicals applied to lawns in urbanized areas, runoff from industrial sites, municipal wastewaters (of more concern for combined sewer overflows), or atmospheric deposition onto impervious surfaces that is later

washed into stormwater. Model studies indicate that the increase in nutrient loading due to increased imperviousness is dramatic. Nutrients can be removed from stormwater prior to discharge through biological uptake such as by plantings in stormwater quality control ponds.

Most models of nutrient loadings that have an extensive data base included have been based on agricultural and forest operations. These have applicability to wash off from fertilized lawns and forested areas but not to the impervious areas. Models of nutrient loading in urban runoff are typically based on wash off type calculations or user-defined loadings and concentrations, all of which require user-defined constants and are relatively simplistic. A relatively new model called IDEAL, has additional treatment procedures for nutrients loads and removal using isothermic relationships that define adsorbed to dissolved nutrient ratios.

### 1.6.2. Effects of Development on Watershed Hydrology

Development and urbanization can potentially have the following impacts on receiving waterbodies:

Changes to Channelized Flows;

- Increased runoff volumes;
- Increased peak runoff discharges;
- Greater runoff velocities;
- Increased flooding frequency;
- Lower dry weather flows (base flow);

Changes to Channel Geometry;

- Channel incision and enlargement;
- Erosion of banks;
- Changes in channel bed substrate due to sedimentation;

Degradation of Aquatic Habitat;

- Degradation of habitat structure and complexity;
- Decline in channel biological functions;

Water Quality Impacts;

- Reduced oxygen in waterbodies;
- Microbial contamination;
- Hydrocarbons and toxic materials;
- Sedimentation;
- Other pollutant loadings.

Property Damage and Safety Concerns;

Unightly Aesthetic Channel Conditions and Restricted Use of Waters.

### 1.6.3. Steps to Successful Stormwater Management Plans

Proper planning is necessary to ensure that stormwater management is considered and fully integrated at the various stages of the site-development process. This involves a comprehensive approach to site planning and a thorough understanding of the physical characteristics and resources associated with the project site.

This planning includes addressing each of the following categories:

- Stormwater quantity controls;
- Erosion and sediment controls;
- Stormwater quality controls;
- Stormwater conveyance controls;
- Maintenance schedules for construction and post-construction activities.

The design of successful stormwater management plans involves adhering to the following principles, where applicable:

- Pre-submittal site meeting/site visit; Review of site development requirements;
- Detailed site analysis and supporting calculations;
- Thorough knowledge of the impact(s) the stormwater system may have on the watershed;
- Creation of a Master Plan to address drainage and stormwater issues or concerns; and
- Approval and completion of the land disturbance permit application.

In Chapter 2, the procedure for including the necessary documentation for a complete land disturbance application is provided.

#### **1.6.4. Innovative Design Approach**

When designing for land disturbance activities, the design must address the following four (4) categories of control: water quantity (flood control), design storm control (rate and volume), erosion prevention and sediment control, and pollution control (water quality standards, post-construction). If an innovative stormwater design approach is to be used, the design professional should take the following considerations in mind, in addition to meeting the four categories of control:

Stormwater quantity and quality are best controlled at the source of the problem by reducing the potential maximum amount of runoff and pollutants. Source control will typically be more economical by preventing pollution from entering the stormwater system rather than removal.

Best management practices (BMPs) implement stormwater management by using simple, structural and nonstructural methods along with or in place of traditional stormwater management structures when applicable;

Equaling or exceeding traditional stormwater management designs in terms of performance (rate/volume attenuation, pollutant removal) and economic feasibility (long-term) are essential to a proposed concept's eventual approval.

Innovative approaches to site design focus on source control for stormwater runoff that limit the amount of runoff generated for a BMP to control.

### 1.6.5. Best Management Practices and Site Planning Process

The first step in addressing stormwater management begins in the site planning and design stage of the development project. By implementing BMPs during the site planning process, the amount of runoff and pollutants generated from a site can be reduced by minimizing the amount of impervious area and utilizing natural on-site treatments. The minimizing of adverse stormwater runoff impacts by the use of BMPs and site planning is a major consideration for a design professional.

The reduction of runoff volumes and stormwater pollutants decreases the total number and size of stormwater management controls that must be implemented under the guidelines set forth in this Manual. Effective BMPs that can reduce the amount of total post-development impervious areas and that maintain natural characteristics of the pre-development site conditions are encouraged. Therefore, the post-development curve numbers and time of concentrations are maintained more closely to the pre-development conditions. This reduces the overall hydrologic and hydraulic impact of the development.

#### 1.6.5.1. Maintaining Site Resources and Natural Undisturbed Areas

Conservation of site resources and natural undisturbed areas helps to reduce the post-development runoff volume and provides areas for natural stormwater management. Some examples are, but not limited to:

- Natural drainage ways;
- Vegetated buffer areas along natural waterways;
- Floodplains;
- Areas of undisturbed vegetation;
- Low areas within the site terrain;
- Natural forested infiltration areas;
- Wetlands.

#### 1.6.5.2. Lower Impact Site Layout Techniques

Lower impact site layout techniques involve identifying and analyzing the location and configuration of structures on the site to be developed. Some options are, but not limited to:

- Fit the design layout to follow the natural contours of the site to minimize clearing and grading and preserve natural drainage ways and patterns;
- Limit the amount of clearing and grading by identifying the smallest possible area on the site that would require land disturbance;
- Place development areas on the least sensitive areas of the site and avoid steeply sloped areas and wetlands when possible;
- Utilize nontraditional designs to reduce the overall imperviousness of the site by providing more undisturbed open space and minimizing clear-cutting;
- Consider the utilization of cisterns and rain barrels to collect stormwater for reuse;

- Energy dissipation devices should be used at all discharge points. Level spreaders can be considered for discharge points into ponds and other basin-type BMPs. More information on these devices is provided in Chapter 3.

#### 1.6.5.3. **Minimization of Impervious Cover**

The minimization of total impervious area directly relates to a reduction in stormwater runoff volume and the associated pollutants from a development site. The amount of impervious cover on a site can be reduced by the following techniques where applicable:

- Reduce building footprints by constructing some buildings as multi-story;
- Reduce parking lot areas and use porous/pervious pavement surfaces for desired overflow parking where feasible;
- Reduce roadway and cul-de-sac widths where feasible
- Increase the amount of vegetated parking lot “islands” that can also be utilized for stormwater management practices such as bio-retention areas;
- Disconnect impervious surfaces by directing runoff to adjacent pervious areas so that runoff can be filtered and infiltrated.

#### 1.6.5.4. **Utilization of Natural Features for Stormwater Management**

Structural stormwater drainage controls are traditionally designed to quickly remove stormwater runoff from the site without utilizing any of the natural storage areas. These natural drainage areas may be considered as potential stormwater drainage systems. These natural areas can be utilized in the following ways where applicable:

- Vegetated buffers and undisturbed areas on the site are useful to control sheet flow (not concentrated flows) by providing infiltration, runoff velocity reduction, and pollutant removal;
- Various natural drainage ways may be maintained and not disturbed to provide a natural stormwater drainage system to carry runoff to an existing outlet. The use of natural drainage ways allow for more storage of stormwater runoff, lower peak flow rates, a reduction in erosive runoff velocities, and the capture and treatment of pollutants;
- When grade is adequate, use vegetated swales instead of curb and gutter applications where applicable. This application allows for more storage of stormwater runoff, lower peak flow rates, a reduction in erosive runoff velocities, and the capture and treatment of pollutants which does not occur with curb and gutter systems;
- Where ditched roadways are not practical, curb and gutter systems may be combined with vegetated swales at outfalls to provide added water quality benefits versus the traditional piped outfall designs;
- When applicable, direct rooftop runoff to pervious natural areas for water quality treatment and infiltration instead of connecting rooftop drains to roadways and other structural stormwater conveyance systems.



#### 1.6.5.5. **Engineered/Proprietary Devices**

Horry County is aware of the potential benefit in using a number of stormwater engineered devices currently available on the market, such as baffle boxes, cartridge filters, and sock and tube erosion control devices. The Stormwater Department may evaluate any and all such devices specified for a given product and require for each: appropriate drawings, specifications, and discussions as to the applicability of the product, expected performance, and required maintenance. The Stormwater Department reserves the right to request that certain devices be installed and maintained or limit the use of such devices related to achieving water quality objectives for a specific project. See section 3.4.8 in chapter 3 for more information.

### 1.7. **Engineering Design Accountability**

This Manual will assist engineers, plan reviewers, inspectors, and contractors in the design and layout of most land disturbance projects. However, this Manual does not replace or otherwise excuse the need for professional engineering judgment and knowledge. The user of this Manual is hereby cautioned that many aspects of engineering design must be considered, including but not limited to:

- Public health and safety;
- Site-specific conditions or unusual features of a project site that warrant special designs;
- Current versions of design texts, manual, technical documents, and research.

The design engineer (with assistance from other design professionals as needed) is expected to thoroughly investigate field conditions and coordinate all design efforts with Horry County. For applicable projects, construction plans submitted for review and approval must be stamped and signed by a professional engineer, landscape architect, or Tier B land surveyor actively licensed in the state of South Carolina, unless otherwise stated in this Manual. The design professional must have sufficient education and experience to perform a complete and thorough design of each element shown on the construction plans, and must also have complete control to change or alter plans during the design phase. The professional's stamp is a public guarantee that the design has the highest regard for health and safety, protects the environment (air, soil, water) to the maximum degree possible, and serves the interests of the general public within Horry County.

Horry County requires a level of design expertise for stormwater calculations and flooding analyses. Stormwater design criteria are based upon current scientific knowledge and engineering judgment. It should be realized by engineering designers that floods and flooding may occur at any time due to any number of factors beyond the reasonable control of Horry County, such as: greater amounts of precipitation or different rainfall patterns than used in design storms, wet soil conditions, debris or blockage of key stormwater channels, high groundwater tables, etc.

## 1.8. Severability

If any provision of this Manual or its application to any circumstance is held by a court of competent jurisdiction to be invalid for any reason, this holding does not affect other provisions or applications of this Manual which can be given effect without the invalid provision or application, and to this end, the provisions of this Manual are severable.

## 1.9. Contact Information

The Horry County Stormwater Department should be contacted for any questions, clarifications, or other information related to stormwater management and this Manual.

### **Contact for Stormwater Issues:**

Horry County Stormwater Management  
4401 Privetts Road  
Conway, SC 29526  
(843) 915-5160  
Road and Drainage Hotline: (843) 381-8000  
Office Hours: Monday-Friday, 8:00 a.m. - 5:00 p.m.

## 1.10. Definitions

The Stormwater Department shall have the right to define or interpret any other word or term contained within this Manual. The rules of verbal construction found in the Stormwater Management Ordinance apply to this Manual.

1. Best Management Practices (BMPs): activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff.
2. Buffer: an area left undisturbed between neighboring property lines, along natural waterways and/or wetlands.
3. Common Plan of Development: used to determine the total disturbed acreage of a project.
4. Contour: an imaginary line, or its representation on a contour (topographic) map, joining points of equal elevation.
5. Culvert: any structure not classified as a bridge which provides an opening under any roadway, including pipe culverts, and any structure so named in the plans.
6. Datum: a reference from which measurements are made.

7. Detention: the collection and storage of stormwater runoff in a surface or sub-surface facility for subsequent controlled discharge to a watercourse or waterbody.
8. Development: the act of any person, or others who acts on his own behalf, that is required to submit an application for approval to disturb land or encroachment or site construction and is thereafter responsible for maintaining compliance with the County Stormwater Management Ordinance, this Manual and conditions of the approved application.
9. Ditch: a drainage channel in earth created by natural or artificial means to convey surface and/or subsurface water, flowing continuously or intermittently.
10. Drainage: a general term applied to the removal of surface or subsurface water from a given area either by gravity via natural means or by systems constructed so to remove water, and is commonly applied herein to surface water.
11. Elevation: height in feet above a given known datum, such as mean sea level.
12. Embankment or Fill: a deposit of soil, rock or other material placed by man.
13. Engineered Device: a structural device that is designed to improve stormwater quality and/or quantity by controlling runoff volumes, rates, or pollutants, etc.
14. Erosion Prevention Sediment Control: any practice that protects the soil surface and prevents the soil particles from being detached by rainfall or wind.
15. Grading: any displacement of soil by stripping, excavating, filling, stockpiling, or any combination thereof, including the land in its excavated or filled state.
16. Impervious Surface: a surface which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. The term includes most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar structures.
17. Intergovernmental Agreement: An agreement between the County and participating municipalities allowing the County to charge utility fees and complete stormwater related work within the municipalities.
18. Mean Sea Level (MSL): the average (mean) height of the sea or ocean, in reference to NAVD29 or NAVD88.
19. Minor Subdivision - shall mean the division of land whether by deed, plat, or other recorded or unrecorded instrument, of a tract or parcel of land into ten (10) parcels or less.

20. MS4: a system of conveyances that include, but are not limited to, catch basins, curbs, gutters, ditches, man-made channels, pipes, tunnels, and/or storm drains that discharge into waters of the state.
21. Outlet Facility: stormwater management facility designed to regulate the elevation, rate, and volume of stormwater discharge from detention facilities.
22. Owner/Operator: means the property owner, or any person who acts on his own behalf, that submits an application for approval to disturb land or vegetation or for encroachment, and the person, if so designated by default or on legal documents, as the responsible party for maintenance of a stormwater system(s) and facility(s). May be referred to as owner, owner/operator or agent. Certification signatures must be provided by this person.
23. Pervious Surface: a surface type that allows water to penetrate through the surface and drain to the ground below.
24. Pollutant: dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.
25. Post-Development Conditions: those conditions which are expected to exist, or do exist, after alteration, of the natural topography, vegetation, and rate, volume or direction of stormwater runoff, (resulting from development activity).
26. Pre-Development Conditions: those conditions, in terms of the existing topography, vegetation and rate, volume or direction of stormwater runoff, which exist at the time the applicant submits an application form for a land disturbance permit or waiver.
27. Project: improvements and structures proposed by the applicant to be constructed on a defined site as part of a common plan of development.
28. Rate: volume of water passing a point per unit of time, generally expressed in cubic feet per second (cfs).
29. Redevelopment: See Development.
30. Retention: the collection and storage of stormwater runoff without subsequent discharge to surface waters.
31. Retrofit: the process of altering an existing drainage system to function properly or more efficiently that currently exists. Retrofitting will be a common method used by the County to address TMDLs (retrofitting systems to include a water quality/runoff treatment device).

32. Runoff: that part of rainfall that is not absorbed into the site but flows over the site as surface waters.
33. Sediment: fine, particulate material, whether mineral or organic, that is in suspension and is being transported, or has been transported, from its site of origin by water or air.
34. Sedimentation: the process which operates at or near the surface of the ground, or deposits soils, debris and other materials either on other ground surfaces or in the waterbody.
35. Sedimentation Facility: any structure or area which is designed to retain suspended sediments from collected stormwater runoff, to include sediment basins.
36. Shallow Concentrated Flow: stormwater flow after approximately 300 feet of sheet flow and before channelized flow.
37. Sheet Flow: flow over plane surfaces, usually within the headwaters of streams.
38. Single Family Residential: buildings containing one (1) dwelling unit located on a single lot. This classification includes mobile home and factory-built housing.
39. Site: any tract, lot, or parcel of land or combination of tracts, lots, or parcels of land which are in common ownership, or are contiguous and in diverse ownership where development is to be performed as part of a unit, subdivision, or project.
40. Site Construction: is considered the act or process of altering the natural cover or topography and alters the quality or quantity of stormwater runoff.
41. Special Protection Areas: designated areas within the County within which more stringent design standards have been established to address an existing problem, such as flooding or water quality. Construction activities occurring within these areas will be required to comply with the additional or more stringent design criteria.
42. Storm Frequency: rate of likely recurrence of a rainstorm.
43. Stormwater Management Plan: the plan to manage stormwater in terms of collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner to meet the objectives of this the County Stormwater Management Ordinance, this Manual and their terms, including, but not limited to, measures that control the increased volume and rate of stormwater runoff and water quality impacts caused by man-made changes to the land. This plan is approved as detailed in this document and includes the engineering calculations and construction drawings.

44. Subdivision: all divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development, and includes all division of land involving a new street or change in existing streets, and includes re-subdivision which would involve the further division or relocation of lot lines of any lot or lots within a subdivision previously made and approved or recorded according to law; or, the alteration of any streets or the establishment of any new streets within any subdivision previously made and approved or recorded according to law, and includes combination of lots of record.
45. Undisturbed Area: an area still in its natural state in which no clearing, grading, or other construction activity has occurred.
46. Vegetation: all plant growth, especially trees, shrubs, mosses, and grasses.
47. Vegetative Buffer: an area of existing, dense vegetation intended to slow runoff, trap sediment and pollutants, and provide some infiltration into underlying soils.
48. Wetlands: those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

## **CHAPTER 2**

### **2. STORMWATER PERMITTING PROCEDURES/PLAN SUBMITTAL REQUIREMENTS**

This chapter provides developers, owners, engineers, contractors, and others with the information needed to obtain approval of a stormwater management plan from the Stormwater Department as required for certain construction activities within unincorporated Horry County and encompassed municipalities as authorized under intergovernmental agreements. This section describes conditions when a permit is needed, the types of applications that apply to different situations, application package requirements, and when and if waivers of such requirements are applicable for certain exempted activities.

#### **2.1. Duty to Comply**

Unless otherwise allowed by the Stormwater Management Ordinance or this Manual, the surface of land in Horry County shall not be disturbed or altered for any purpose whatsoever, nor any major drainage channel or component of the stormwater system impeded or encroached upon without approval from the Stormwater Department. Site construction activities cannot commence prior to approval from the Stormwater Department and issuance of a Horry County Stormwater Permit (Permit). The Permit must be on site throughout the course of construction.

#### **2.2. Statutory Authority**

The Horry County Stormwater Management and Sediment Control Ordinance went into effect October 1, 2000 and was subsequently amended January 6, 2009.

#### **2.3. Basic Criteria**

All land disturbance activities associated with land development and construction are required to obtain a stormwater permit if one-half (1/2) acre or more will be disturbed, or the construction is part of a Larger Common Plan (LCP). Land disturbance is defined as any use of the land that results in a change in the physical characteristics or topography that may cause erosion that contributes to sediment and alters the quality or quantity of stormwater runoff. Land disturbance activities associated with Minor Subdivisions of 5 or more lots; as well as, any Minor Subdivision with land disturbances applicable to Section 4.2.4 of SCR030000 are required to obtain a stormwater permit. This also includes mining operations subject to the provisions of Chapter 13, Article VI of the Horry County Code regarding mining permits.

#### **2.4. The Permitting Process**

Upon submittal of a stormwater plan package for County permitting, the project information is reviewed to determine if it is exempt.

1. If the project is exempt, the plan package is stamped by the plan reviewer and uploaded to the County's E-Plats page at <http://www.horrycounty.org/OnlineServices/plansubmittal> for download through the applicant's E-Plats account. A copy will also be sent to the Horry County Code Enforcement Office.
2. If the project is not exempt then the submittal is reviewed for compliance with Horry County Ordinances and the Horry County Stormwater Management Design Manual at <http://stormwater.horrycounty.org/ResourcesTools/OrdinancesManualsandReports.aspx>
3. If the plans are not approved the applicant is notified and informed of any revisions or problems that need to be addressed. A copy of the review comments are then uploaded to the E-Plats page for the applicant to review and resubmit the plan with corrections.
4. If the plans are approved by all county departments a letter of approval is issued and uploaded to the E-plats page for the applicant to download. The Applicant then submits the approved NOI and the Stormwater Plan Approval Letter to SCDHEC as part of SCDHEC's review process.
5. Once all review comments have been adequately addressed and the plans are approved, SCDHEC issues the applicant their permit for coverage and the permit is received by the County through the applicant and a stormwater MS4 permit will be signed by the Stormwater Department and issued to the applicant.

See Appendix A for a flow chart of the process or go to <http://stormwater.horrycounty.org/Portals/21/Documents/Engineers/manuals%20and%20regulations/Permitting%20Process%201.pdf>

## 2.5. Stormwater Permit Application and Approval Procedures

Applications required in this Manual shall be considered complete only if they are submitted in the required format and include all mandatory information. The Stormwater Department will begin the review process once the application package is received and has fifteen (15) working days to either approve, deny, review comments, or request further information from the applicant. The above time frames will be suspended during Declared Emergencies. Any application that is determined to be incomplete shall be returned to the applicant along with an explanation of the application's deficiencies. No further processing of the application shall occur until the deficiencies are corrected. Once the deficiencies are corrected, the application may be resubmitted provided that it is resubmitted within six (6) months of the date that the application was returned to the applicant. An application resubmitted more than six (6) months after the date that the application was returned is considered expired and a new permit application will be required.

For non-linear construction sites disturbing more than five (5) acres but less than ten (10) acres, the application package must be submitted with a phased erosion control and sediment control plan. This plan identifies all BMPs and grading work implemented during certain portions of a site's construction. A separate plan sheet is to be used for each phase according to the following requirements:



1. For site disturbances of less than ten (10) acres, a minimum of two (2) phasing plans shall be developed, which include the initial land disturbance phase (installation of perimeter controls, construction entrances, sediment basins/traps, etc.) and stabilization phase. Each phase should be addressed on a separate plan sheet and should indicate all conditions and BMPs necessary to manage stormwater runoff, erosion and sediment control.
2. For site disturbances of ten (10) acres or more, a minimum of three (3) phasing plans shall be developed, which include the initial land disturbance phase, construction phase and stabilization phase. Each phase should be addressed on a separate plan sheet and should indicate all conditions and BMPs necessary to manage stormwater runoff, erosion and sediment control.

### **2.5.1. Plan Revisions**

Any major or minor modifications to the approved stormwater permit should be submitted in writing to the Stormwater Department for review. Such changes shall not be implemented until approval is given. Substantial revisions for stormwater management issues may include, but are not limited to, changes in discharge point locations, pipe size and grade alterations that affect hydraulic capacity, changes to easement boundary due to changes in the stormwater system components, or changes to the general grading plan of the site that affect the flow direction, rate, volume, or quality of stormwater runoff.

### **2.5.2. Site Documents/Inspections**

The owner/operator is required to maintain onsite at least one (1) copy of all approved permits, technical reports, inspection reports, and construction documents, available upon request by Horry County. The Stormwater Department will conduct inspections during the construction phase. Frequency and specific times and dates of these inspections will be done at the discretion of the Stormwater Department. More information on inspections is given in Chapter 4. During construction, the owner or designated representative (contractor) must conduct inspections of all temporary erosion and sediment controls on the site in accordance with the submitted and approved maintenance schedule, and if applicable, the NPDES Construction General Permit (CGP) from SCDHEC-OCRM.

### **2.5.3. Permit Transfer**

A stormwater permit may be transferred from one owner/operator to another with notification to the Stormwater Department. The most obvious example of this is when a developer readies a piece of property for a new neighborhood by performing grading activities, utility installation, the building of roads, and then turns the property over to a homebuilder(s). In such cases, the applicant must make Horry County and SCDHEC aware in writing of plans to transfer ownership of the permit and associated stormwater management issues through completion of the permit transfer form in Appendix B within five (5) business days. A transfer of permit coverage is also allowed for phases within a project. If a permit transfer is not requested using the appropriate form, the current permit holder will continue to be held responsible for stormwater management issues at the site.

#### **2.5.4. Closeout**

At the conclusion of construction, the owner/operator is responsible for making sure a site is stabilized with vegetation established, paved areas and stormwater conveyances clean of debris and sediment, and stormwater controls are consistent with the approved as-built plans. Any problems found must be corrected by the owner prior to closing out a County permit. Upon confirming any such corrections are completed and the site is ready, the owner/operator will notify the Stormwater Department. The Stormwater Department may require additional items in order to closeout a permit.

#### **2.5.5. Expiration of Permit**

A stormwater permit will remain valid for up to five (5) years from the date of issuance, provided that the project is in compliance with the Stormwater Management Ordinance and this Manual and is not inactive for a period of twelve (12) consecutive months. Construction activity must be initiated within six (6) months of issuance of the County permit. Failure to initiate construction may render the permit invalid at the end of the sixth (6) month.

#### **2.5.6. Responsibility of Owner/Operator**

During any construction operation, the owner/operator shall be responsible for carrying out the proposed work in accordance with the permit, approved plan, specifications, and time schedule; and in compliance with all requirements of the Stormwater Management Ordinance and this Manual.

#### **2.5.7. Variances**

The Stormwater Department may grant a variance from the requirements of this Manual if exceptional circumstances exist such that strict adherence to the provisions of this Manual will result in unnecessary hardship to the owner/operator or person and will not fulfill the purpose of this Manual and the Stormwater Management Ordinance.

A request for variance must be submitted in writing by the owner/operator. The request must provide details as to the nature and reason for the request and supporting technical documentation (recommend including applicable Manual sections). The owner/operator will include in writing the following information to support the request:

1. Demonstrate that the variance will not conflict with the purposes of this Manual, the Stormwater Management Ordinance or the regulatory requirements of Local, State, or Federal jurisdictions having authority;
2. Demonstrate extraordinary and exceptional conditions pertaining to the particular project;
3. Demonstrate conditions that do not generally apply to other property in the vicinity;
4. A variance will not be of substantial detriment to adjacent property or to the public good;
5. Provide technical documentation including testing, performance, or other data that supports the requested variance.

The Stormwater Department shall render, in writing, a decision on the request within twenty (20) working days of the receipt of the written request for variance.

### **2.5.8. Appeals**

An applicant may appeal the decision of the Stormwater Department to the Horry County Zoning Board of Appeals within thirty (30) days after the date of the Stormwater Department's response. The Stormwater Department shall provide the petition form to the owner/operator.

1. The petition must be accompanied with a \$25.00 fee that will be used to partially defray the costs incurred in connection with the administration of petitions filed pursuant to this section.
2. The Zoning Board of Appeals shall hear the petition at the regularly scheduled meeting.
3. The Zoning Board of Appeals shall render a written decision on each petition that is heard, and such written decision shall be issued within twenty (20) working days from the day the Board heard the petition. The decision of the Zoning Board of Appeals shall contain findings of fact and conclusions of law, and the decision shall be sent to the petitioner by first class mail.
4. The decision of the Zoning Board of Appeals shall be final unless the petitioner appeals the decisions to the circuit court in Horry County within thirty (30) days after the date of the decision of the Zoning Board of Appeals.

### **2.5.9. Encroachment Permits**

An encroachment permit, which controls the impacts of traffic, storm drainage, and sediment entering a public road right-of-way, must be obtained from the SCDOT and/or the Horry County Stormwater Department before construction begins. Applicants should be aware of Horry County requirements which may differ from SCDOT's.

A copy of an encroachment permit application(s) to SCDOT must be included in the stormwater permit application package. This is allowed because SCDOT will not approve an encroachment unless the stormwater permit has been approved. It is the applicant's responsibility to comply with all SCDOT encroachment permit application requirements. Approved encroachment permits are required prior to final closeout by the Stormwater Department.

## **2.6. The Stormwater Management Plan**

The purpose of the Stormwater Management Plan is to specify how the built project will incorporate site design characteristics, landscape features, and BMPs that minimize imperviousness, retain or detain stormwater, slow runoff rates, and reduce pollutants in post-development runoff. The Stormwater Management Plan must incorporate measures to treat stormwater runoff before it is discharged from the site; these treatment facilities must be designed to minimum criteria specified by this Manual. The Stormwater Management Plan must also

identify responsibility and a mechanism to ensure maintenance of the treatment facilities in perpetuity. Development of a Stormwater Management Plan must be coordinated and integrated with preparation of the site layout, landscaping, and drainage. The Stormwater Management Plan is separate from, and in addition to, a stormwater pollution prevention plan which addresses requirements for erosion and sediment control and for pollution prevention measures during construction. Refer to Chapter 3: Design Standards for specific design criteria and requirements. The following items are stormwater specific and do not reflect that of other department requirements.

### 2.6.1. The Plan Package

The major components of the plan package for stormwater review consists of the following:

- a. Major Subdivisions and Commercial Projects
  - Stormwater Report
  - SCDHEC Notice of Intent (Also used for Horry County permit application)
  - Stormwater Pollution Prevention Plan (SWPPP)
  - Stormwater Practices Permanent Maintenance Covenants
  - Stormwater Master Plan and Report
  - Preliminary Plat
  - Grading and Drainage Plan
  - Erosion and Sediment Control Plan
  - Landscape Plan
- b. Minor Subdivisions
  - i. Minor Subdivisions with less than 5 lots and less than 1 acre land disturbance or ½ acre land disturbance within ½ mile of receiving water.
    - Sketch Plan illustrating the limits of land disturbance
    - SC DHEC “land disturbance calculation”: Amount of Disturbance =  $2[\text{Max Restricted Building Size}][\text{Number of Lots}] + \text{Right of Way (ROW) areas}$  {ROW areas include clearing for roads, utilities, easements etc.}
  - ii. Minor Subdivisions with 5-10 lots and less than 1 acre land disturbance or ½ acre land disturbance within ½ mile of receiving water.
    - Grading and Drainage Plan
    - Erosion and Sediment Control Plan
    - Stormdrain and Conveyance Calculations (25-yr design storm)
    - SC DHEC “land disturbance calculation”: Amount of Disturbance =  $2[\text{Max Restricted Building Size}][\text{Number of Lots}] + \text{Right of Way (ROW) areas}$  {ROW areas include clearing for roads, utilities, easements etc.}

- iii. Minor Subdivisions with greater than 1 acre land disturbance or ½ acre land disturbance within ½ mile of receiving water.
  - Stormwater Report
  - Stormwater Pollution Prevention Plan (SWPPP)
  - SCDHEC Notice of Intent (Also used for Horry County permit application)
  - Stormwater Practices Permanent Maintenance Covenants (when applicable)
  - Detention Waiver and Supporting Documentation (when applicable)
  - Grading and Drainage Plan
  - Erosion and Sediment Control Plan

Note 1 – Horry County may request a downstream analysis and/or peak discharge reduction calculations for any Minor Subdivision. Detention waivers may be granted on a case by case basis.

Note 2 – Per the Stormwater Ordinance, all projects, regardless of size which are located within one thousand feet (1,000-ft) of shellfish beds, the first one and one-half inch (1 ½”) of runoff from the built upon portion of the property must be retained on site.

### 2.6.2. The Stormwater Report

A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in this Manual. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the state of South Carolina. The Stormwater Report must include:

Summary table which includes:

- Major Subdivisions and Commercial Projects - Peak inflows, peak outflows, and max pond water surface elevations for the 2, 10, 25 and 100-yr storms.
- Minor Subdivisions - Peak inflows, peak outflows, and max pond water surface elevations for the 2, 10 and 100-yr storms.

Narrative which includes:

- A brief narrative describing stormwater management practices.
- All elevations must be based on NAVD 88.
- NRCS soil identifications and characteristics.
- Describe pre- and post-conditions and any flooding issues.
- Describe topographic and soil conditions.

- Upstream and downstream conditions (known flooding issues).
- Existing tail water elevations and any assumptions.
- An analysis and details for any streams that may be affected or within ½ mile radius of a water body listed on the 303D SCDHEC list or if a TMDL is established. If the project does not fall into these criteria then this shall be clearly stated in the narrative.
- A general description of adjacent properties and existing structures located on surrounding properties.
- Site acreage also pond area in (Ac Ft).
- Narrative of 10% downstream analysis. Include pinch points and outfall conditions determining the effects from the project and any potential flooding.
- Anticipated start and completion dates.
- If using a feature which insensitive to water table elevations state the water table elevation and the method of determination.
- The narrative must describe storage volume assigned to nodes or points in the model for wetland storage or ditch storage and these areas must be illustrated in watershed maps.
- Boundary points with tail water elevations should be provided in the site summary table and the page number(s) with tail water in the model report should be identified in the site summary table.
- The NOAA 14 rainfall chart is a required site supporting document in the C-SWPPP.

Maps included are:

- FEMA and Flood Zones.
- Project location.
- USGS quadrangle sheet (show project location, route runoff from site to nearest water body).
- Wetland permit or certification letter if required.
- Map of 10% downstream analysis map with points of interest.
- Map to show offsite drainage through or onto the site.

Supporting documents included are:

- Offsite easement agreements for outfalls (when required)
- Adjacent property owner's agreement for new point discharge onto adjacent property that was not previously existing.
- If an infiltration system used: Geotechnical report with infiltration rates.

Site Hydrology:

- Size of Areas (Acreage).
- Post-development is less than pre-development by 20% (for projects over 5 acres).  
Note: Post- vs pre-discharge rates are based on peak rate point discharges and not accumulative site discharge.
- CN designations calculated avg. or designation.
- Soils information (type, special characteristics, perk rate if a perk system is used, water table if dry pond is used).
- Proper rainfall intensities used for 2, 10, 25,100-yr storms –Use NOAA Atlas 14 charts).
- Correct Peaking factors used (256 pre, and 323 post).

- Volume Hydrographs for SCS 24 hr.
- 10, 25, 100-yr peak inflow/outflow and max water elevation of ponds (note on drawing as well).
- Drainage nodes.
- Provide Basin and node map.
- Design calculations for culverts and storm sewers.
- Design calculations, cross sections and method of stabilization of existing and planned channels (include temporary linings) 10-yr storm velocities of 5fps.
- Design calculations and construction details of energy dissipaters below culverts and storm sewer outlets (for rip-rap aprons, include stone sizes (diameters) and apron dimensions).
- Tail water conditions (elevations of outfall ditch match and tail water condition should reflect an existing 25-yr event in the ditch if using a static condition).
- Water Quality Calculations for sediment basins and/or other construction site BMPs.
- Water Quality calculations for post-construction BMPs.
- 10 % downstream analysis.

The Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Horry County Stormwater Manual and Horry County ordinances.

### 2.6.3. Notice of Intent Information

The applicant must submit a plan package for all projects including a completed Notice of Intent (NOI) form from SCDHEC. (The county uses this form as your MS4 application). The NOI form can be found in Appendix C and at <http://www.dhec.sc.gov/library/d-2617.pdf>. SCDHEC's water quality mapping tool that generates an NOI with water quality information can be found at <http://gisweb01.dhec.sc.gov/water/Stormwater.html?mode=1/Stormwater.html> (generally the applicant will also submit a plan package to SCDHEC). Also, complete and submit the SCDHEC Plan Review Checklist found at <http://www.dhec.sc.gov/Environment/docs/erfchecklist.pdf> with the NOI.

### 2.6.4. Stormwater Pollution Prevention Plan (SWPPP)

A Stormwater Pollution Prevention Plan (SWPPP) identifies structural and non-structural controls that will be put in place to minimize negative impacts, caused by offsite stormwater discharges, to the environment. The purpose of these controls is to minimize erosion and run-off of pollutants and sediment. A SWPPP establishes procedures for minimizing the potential for pollutants to be carried away in stormwater discharges. These procedures emphasize the use of *Best Management Practices* (BMPs) to provide the flexibility to address varying sources of pollutants. A SWPPP must describe the site characteristics and list the pollutants that could impact stormwater quality. The plan must also identify pollution prevention measures designed to minimize the discharge of pollutant laden stormwater. For a SWPPP template from SCDHEC, go to <http://www.scdhec.gov/Environment/WaterQuality/Stormwater/SWPPPs/>.

The SWPPP is required to be onsite or readily accessible upon request. The Inspector will request this document during inspections to verify it is current. The SWPPP must include:

- Narrative.
- Stormwater Management and Sediment Control.
- Reporting forms and logs of inspections.
- Sequence of construction.
- Site features and sensitive areas (Buffer zones).
- Sources of pollution.
- BMPs.
- Maps.
- Engineering report.
- Construction site plans.
- Non-Numeric effluent limits.
- Management of non-stormwater discharges.
- (TMDL) Documentation of permit eligibility related to Total Maximum Daily Loads.

### 2.6.5. Preliminary/Final Plat –

Preliminary/Final Plat is a plat with easements and legal boundaries. These plans include the following:

- All Easements labeled Public or Private.
- Easement widths (check for both pipe and ditches).
- Pond maintenance easement.
- Note: “All drainage easements shall be cleared and remain free of structures and obstructions.”
- Engineer's or Surveyor's Seal.
- Wetland limits.

Additional information may be required by the Stormwater Department as deemed necessary to adequately document the conditions of the road and drainage systems.

### 2.6.6. Grading and Drainage Plan

Site Plans (General observations) to include:

- Engineers Seal.
- Verification that each phase can stand on its own hydraulically if no other phase is built.
- Size of Areas (Acreage).
- Adjoining lakes, streams, or other major drainage ways.
- Existing and planned drainage patterns (include off-site areas that drain through project).
- Include Landscape Plan and check if it is encroaching on an easement.
- Note: The land disturbing activity will be accomplished pursuant to the concept plan and the county has the right to conduct on-site inspections.
- Note: Final inspections will not be conducted until a final as-built has been submitted to the county.
- Show average bottom elevation, normal water level, 25-yr and 100-yr water level, Top of Bank elevation, area of storage in Acre-Feet on all ponds.
- Average depth of pond.



- Utility lines.
- Directional arrows should be shown on the plan for each planned lot in the subdivision to show the drainage direction (can be shown with typical lot grading detail). Trash racks and safety grates on weir structures.
- Existing and proposed contours 25 feet outside of all property lines and further if county deems necessary for clarity.
- Show drainage flow patterns for sheet flow.
- Show spot elevations for swales every 100 feet.
- FFE of proposed buildings.
- Show all drainage lines with size, length, type, slope, and invert elevations
- Show all catch basins and junction boxes with rim and invert elevations

#### General Information

- North arrow.
- Scale (not to exceed 1:100).
- Property lines.
- Legend.
- Planned and existing buildings location and elevations.
- Planned and existing roads location and elevations.
- Lot and/or building numbers.
- Limits and acreage of disturbed area.
- Streams, lakes, ponds, drainage ways, dams.

#### Stormwater Structure Details

- Show Pipe detail.
- Show catch basin detail (frames fully supported on box wall or structural top.
- Provide detail of pond.
- Outfall structure details with dimensions and design elevations.
- Swale detail.
- Ditch detail.
- All roadside and outfall ditches.
- Note: All Structures are to meet SCDOT standards.
- Emergency spillway detail.
- Level spreaders must consist of a permanent concrete weir/lip or geo-grid with compacted base to 95% Standard Proctor.
- Level spreaders must include underdrains.
- Storm drain inserts or inlet filters shall not be used in public or private roadways with the exception of manufactured hooded BMPs that meet all manufacturer design and sizing specifications.

#### Drainage Profiles

- Profiles provided for the 25-yr HGL (starting tail water at 25-yr elevation and grades stays below the inlet grate).
- Provide pipe data (Slope, Type, Size, Length).
- Catch basin data. (Grate elev., Sump elev. Size of box, type of box, pipe inverts).

- Existing and proposed surface grade.
- Provide profiles to show tops and toes for all ditches over 1 foot in depth.
- The rim of all storm drain inlets shall be above the 100-year water surface elevation of the pond the inlet drains to.
- The maximum flow length in a swale is 200-ft.
  - The maximum flow length can be extended to 350-ft if a minimum slope of 1.5% can be provided for the entire swale reach.
  - The maximum flow length can be extended to 300-ft for subdivisions with 100-ft lot widths.

Additional information may be required by the Stormwater Department as deemed necessary to adequately document the condition of the road and drainage systems.

### 2.6.7. Sediment and Erosion Control Plan

#### Erosion Control Notes

- Standard OCRM Notes.
- Construction sequence related to sedimentation and erosion control.
- Maintenance requirements during construction.
- Person responsible for maintenance during construction and where records are kept.
- Maintenance schedule, description and procedures for permanent structures.
- As-built to be supplied to the county prior to final inspection (and certified by either a PE or PLS in South Carolina).
- Must have the statement: “The land disturbing activity will be accomplished pursuant to the Stormwater Management Plan and the County has the right to conduct on-site inspections.”

#### Erosion Control Details

- Location of temporary and permanent measures.
- Concrete wash out detail (locate the washout on the plans).
- Construction drawings and details for temporary and permanent measures.
- Silt fence detail.
- Construction Entrance.
- Wetland crossing details if used.
- Provide details for dewatering onsite (ponds, inlets, and ditches).
- Provide Individual lot erosion control plan/detail.
- Show spillway detail.
- Stockpiled topsoil or subsoil location.

#### Vegetative stabilization details

- Areas and acreage to be stabilized.
- Requirements for temporary ground cover.
- Planned vegetation with details of plants, seed, mulch, fertilizer.
- Rates for seed, fertilizer and mulch.
- Specifications for permanent and temporary vegetation.

- Method of soil preparation.

Additional information may be required by the Stormwater Department as deemed necessary.

### **2.6.8. Landscape Plan**

- No landscaping or berms to be located in drainage easements.
- No landscaping in swales.
- Berms are to have a slope of 3:1 and be stabilized with vegetation.

Additional information may be required by the Stormwater Department as deemed necessary.

### **2.6.9. Preliminary As-Built Plan Requirements –**

Prior to completing the installation of the asphalt and curbing and prior to scheduling a proof roll inspection, a preliminary "as-built" plan signed and sealed by a professional registered in South Carolina shall be submitted to the Horry Stormwater Department for review and approval. The purpose of this plan is to ensure the pipe and catch basin structures are located in the proper place as well as installed at the proper elevations to avoid disturbance of a final finished product in the asphalt and curbing. In the as-built plan the registered professional shall state:

- The facilities have been constructed as shown on the Preliminary As-built Plan, and;
- The facilities meet the approved Stormwater Management and Sediment Control Plan and specifications or achieve the function for which they were designed.

Also, the minimum information to be provided on the Preliminary As-built Plans shall include the following:

- Boundary, phase and lot lines.
- Lot numbers and street names.
- Drainage structures with elevations.
- Drainage pipes with size, material, length, slope and invert elevations.
- Ponds or lakes with average bottom, top of bank and water surface elevations.
- Acre-feet of storage provided.

Additional information may be required by the Stormwater Department as deemed necessary to adequately document the condition of the road and drainage systems.

### **2.6.10. Final As-Built Plan Requirements**

Upon completing the installation of the stormwater management facilities included in the Stormwater Management and Sediment Control Plan, an "as-built" plan signed and sealed by a professional registered in South Carolina shall be submitted to the Horry County Stormwater Department for review and approval. The as-built plan must be submitted prior to any final inspection scheduling. In the as-built plan the registered professional shall state:

- The facilities have been constructed as shown on the "as-built" plan, and
- The facilities meet the approved Stormwater Management and Sediment Control Plan and specifications or achieve the function for which they were designed.

Also, the minimum information to be provided on the "as-built" plans shall include the following:

- Boundary, phase and lot lines.
- Lot numbers and street names.
- Easements.
- Road locations with centerline stationing and curve data.
- Road centerline elevations at 100-foot intervals.
- Drainage structures with elevations.
- Drainage pipes with size, material, length, slope and invert elevations.
- Ponds or lakes with average bottom, top of bank and water surface elevations.
- 25 and 100-year storm elevation of pond.
- The Acre/feet of storage in a 25-year rainfall event.
- Any control structures shall be shown in detail with key-way dimensions and stage elevations. If structure is off site, include a note of its location.
- Drainage ditches and swales, with elevations at 100-foot intervals and critical locations.
- Recommended maintenance plan and schedule for drainage system components

The tolerance for the installation of stormwater catchment structure rim elevations will be no more than 0.2-ft from the design plans. In the event a stormwater catchment structure rim elevation is greater than 0.2-ft, replacement may be required.

The final as-built shall quantify, in square feet, the amount of new impervious surfaces resulting from the land development of commercial projects.

If the elevations or dimensions of the structures significantly differ from the approved plans, a new analysis of the drainage system (e.g. routing, water quality and 25 year HGL) will be required.

Additional information may be required by the Stormwater Department as deemed necessary to adequately document the condition of the road and drainage systems.

### 2.6.11. **Stormwater Master Plan**

For all developments that have multiple phases, a Stormwater Master Plan that serves the entire development including future phases shall be submitted. The stormwater master plan shall include stormwater management structures and BMPs, and supporting documentation. Also included are the supporting engineering calculations and results of any computer analysis, if necessary.

The master plan can be a preliminary sketch of the site and shall contain the following items, when applicable:

1. Master subdivision or site layout showing buildings, roads, lots, parking areas, utilities, and grassed or landscaped areas.
2. Vicinity map.
3. Master Stormwater Report as per Section 2.6.2 of this manual.

The Stormwater Department reserves the right to require additional information.

## 2.7. **Stormwater Facility Maintenance**

The owner/operator or Homeowners Association (HOA) must record the Horry County Stormwater Practices Permanent Maintenance Covenants as part of the stormwater permitting process. The Maintenance Covenants are provided in Appendix D. The Stormwater Department may inspect a system to ensure maintenance is being performed in accordance with the stormwater permit and the maintenance covenants. Chapter 4 provides information on the County inspection and enforcement procedures.

## CHAPTER 3

### 3. DESIGN STANDARDS

#### 3.1. Purpose and Intent

This chapter includes information for engineers and designers to utilize in designing adequate stormwater management systems that will control the rate, volume, and pollutant loads released from a new or redevelopment project where the Stormwater Department has been authorized by law or agreement to enforce engineering standards. These design standards have been developed based on common engineering practices, state and federal requirements, scientific research, engineering publications, and other municipal and academic guidance.

The design standards included in this chapter should be incorporated along with proper planning, installation and maintenance methods to mitigate the impact of land development on existing/natural hydrologic and hydraulic processes and minimize the further degradation of the water resources in Horry County. The design professional shall use all means necessary to develop land in a manner consistent with all County Ordinances and this Manual. Specific methods and applications not covered in this section can and should be discussed with the Stormwater Department for applicability. The following section details the criteria that shall be followed in the absence of designated specific watershed master plan criteria.

Water quantity and quality are integral and required components of stormwater management. Requirements have been added to improve and preserve the water resources in Horry County. Section 3.4 outlines the standard design procedures for water quantity and quality along with the design criteria for accepted Best Management Practices (BMPs), Low Impact Development (LID) designs and Manufactured Treatment Devices (MTDs).

#### 3.2. General Design Standards

The Horry County design storm is a **twenty-five (25) year**, twenty-four (24) hour, SCS Type III storm event. General requirements for all stormwater systems and facilities will include, but are not limited to, the following:

For Minor Subdivisions, the design storm is a **ten (10) year**, twenty-four (24) hour, SCS Type III storm event.

1. Site designs shall minimize the generation of stormwater and maximize pervious areas by:

- a. The selection of portions of the site where the drainage pattern, topography, and soils are favorable for the intended use. Tracts of land vary in suitability for different uses. Knowing the major characteristics of the land area and the soil types are critical in identifying and evaluating potential problems.
  - b. Exposing the smallest practical area of land for the least possible time during development. This includes maintaining or creating buffers and preserving natural areas.
  - c. Limiting the drainage area to all BMPs. Specific recommended maximum contributing areas to BMPs are provided below.
  - d. When feasible, retaining and protecting natural vegetation and saving topsoil, for replacing on graded areas.
  - e. Using temporary plant cover, mulching, hydroseeding, or other stabilization methods to control runoff and protect areas subject to erosion during and after construction.
2. Annual groundwater recharge rates will be maintained to the maximum extent practical by promoting infiltration through the use of structural and non-structural methods.
  3. Stormwater runoff generated from development shall be controlled to pre-development and/or natural rates. For projects disturbing one-half (1/2) acre to five (5) acres, the 10-year, 25-year, and 100-year, 24-hour post-development peak discharges must not be greater than the pre-development peak discharge rates. For projects disturbing more than five (5) acres, stormwater management facilities shall be designed to reduce the twenty-five-year, 24-hour developed peak discharge rates by twenty (20) percent from the existing peak discharge rates and the 100-year, 24-hour post-development peak discharge rates must not be greater than the pre-development peak discharge rates. Runoff calculations shall include all areas proposed to be disturbed and or regraded. The method for computing adequate control shall be a risk-based approach using several design storms. Greater detail is provided in the next section.
  4. Stormwater runoff generated from development shall be treated through the use of structural and/or non-structural practices. It is presumed that sufficient treatment is provided by the proposed BMPs if they are:
    - a. Designed according to the specific performance criteria outlined in this manual,
    - b. Constructed properly, and
    - c. Maintained regularly.
  5. Stormwater discharges to special protection areas with sensitive resources or that have existing flooding or water quality problems, such as Total Maximum Daily Loads (TMDLs), may be subject to additional performance criteria. Section 3.9 contains more specific information and design requirements and describes the areas that

will receive this additional set of protection criteria.

6. Property owners are responsible for maintaining stormwater quantity and quality facilities and all conveyance structures located on their property. Prior to the issuance of a permit approval for a construction activity, the property owner shall execute a legal document entitled “Horry County Covenants for Permanent Maintenance of Stormwater Systems” (see Appendix D). The property owner shall record the Covenants in the Office of The Register of Deeds in Horry County.
7. The location of the facility, the recorded location of the Covenants document, and a statement of the property owner’s responsibility for maintenance shall be included and also shown on the plat. A post-construction maintenance plan and schedule shall also be included on the as-built plans (see Appendix E for Post-Construction Maintenance Template).
8. Redevelopment, defined as any construction, alteration or improvement of one-half (1/2) acre or more of land disturbance on sites where existing land use is commercial, industrial, institutional, or multi-family residential, is governed by the same design criteria as new developments.
9. Debris from clear cutting, construction, and site preparation must not impede flow or create obstructions within streams and waterbodies. Stream crossings shall be avoided when possible. When stream crossings cannot be avoided, they shall have control devices to collect and divert surface flow from the access road or skid trails into undisturbed areas or other control structures.
10. Stabilization is the process of applying sod or growing, from seed, a vegetative cover on disturbed areas for erosion control during construction and soil-disturbing activities. Permanent stabilization and the long-term erosion prevention structures shall be installed as soon as practical in the development process, but not later than fourteen (14) days after grading has been completed.
11. If wetlands are suspected to exist on the property, they will be investigated and delineated by a qualified professional. The US Army Corps of Engineers (USACE) must make a determination as to whether or not the wetlands fall under their jurisdiction. All Corps delineation approvals must be active (i.e. not expired) at the time of stormwater permit submittal and the delineated wetlands boundaries clearly shown on the stormwater plans. All efforts will be made to reduce or eliminate impacts such as using a buffer and/or installing a silt fence around the wetlands. If the wetlands fall under the jurisdiction of the USACE, a Section 404 permit is needed before any disturbance of the wetlands is allowed. In addition, wetland impacts will require a Coastal Zone Consistency Certification from SCDHEC- OCRM. Stormwater shall not be discharged directly into streams or wetlands without first being routed through some type of approved water quality BMP.
12. All stormwater management and sediment control practices shall be designed, constructed, and maintained with consideration for the proper control of mosquitoes and other vectors.

13. For the purposes of hydraulic design, capacity of a system to transport stormwater runoff shall be based on the size of the contributing drainage basin or subwatershed (for that particular boundary), as outlined below. Any and all offsite drainage coming into or through the system should be addressed through the analysis of the best available topographic data and using professional engineering judgment.

a. Collector Systems and Minor Drainage Systems: 0 - <100 Acres

All street drainage, pipe systems, culverts, ditches and channels which drain less than 100 acres will be designed to carry flows resulting from a twenty-five (25) year, 24 hour storm event. Arterial roads must be designed for the fifty (50) year, 24-hour storm event.

b. Major Drainage Channels: 100 - < 300 Acres

All drainage systems draining at least 100 acres but less than 300 acres, such as channel improvements, culverts or bridges along these channels, shall be designed to carry a flow resulting from a fifty (50) year frequency storm event. Encroachment upon Major Drainage Channels and the adjacent overflow land shall be avoided to the extent practicable.

c. Large Watersheds: 300 and more Acres

Bridges and culverts being constructed in natural channels, creeks, or rivers draining more than 300 acres shall be designed to carry a flow resulting from a 100 year frequency storm event. Encroachment upon these channels and the adjacent overflow land shall be avoided as much as practicable.

The Floodplain provisions for Horry County can be found in the Horry County Flood Damage Prevention and Control Ordinance and any other applicable federal, state or local laws.

14. If a master plan exists for the area/watershed which encompasses the project, criteria set by that plan shall be used for determining the extent of a downstream analysis. Without a master plan, the analysis shall extend up to the top of the watershed and down to a water of the state or to a point in which the project comprises 10% of the total contributing area, whichever occurs first. In this Manual the "ten percent" criterion has been adopted as the most flexible and effective approach for ensuring that stormwater detention ponds provide effective water quantity control downstream from the development site and do not exacerbate flooding problems downstream. The 10% rule evaluation must address "pinch points" where a pipe/culvert would be overtopped and the pipe/culvert will need to be upgraded or the peak discharge rate will need to be limited to the capacity of the downstream system.

The ten-percent rule recognizes the fact that a structural control providing detention has a "zone of influence" downstream where its effectiveness can be felt. Beyond this zone of influence the structural control becomes relatively small and insignificant compared to the runoff from the total drainage area at that point. Based on studies



and master planning results for a large number of sites, that zone of influence is considered to be the point where the drainage area controlled by the detention or storage facility comprises 10% of the total drainage area. For example, if the structural control drains 10 acres, the zone of influence ends at the point where the total drainage area is 100 acres or greater.

Typical steps in the application of the ten-percent rule are:

- a. Determine the target peak flow for the site for predevelopment conditions.
  - b. Using a topographic map determine the lower limit of the zone of influence (10% point).
  - c. Using a hydrologic model determine the pre-development peak flows and timing of those peaks at each tributary junction beginning at the pond outlet and ending at the next tributary junction beyond the 10% point.
  - d. Change the land use on the site to post-development and rerun the model.
  - e. Design the structural control facility such that the overbank flood protection (25-year) post-development flow does not increase the peak flows at the outlet and the determined tributary junctions.
  - f. If it does increase the peak flow, the structural control facility must be redesigned or one of the following options considered:
    - (1) Request a detention waiver from the Horry County Stormwater Department. This waiver would be for water quantity control only and best management practices to achieve water quality goals will still be required.
    - (2) Work with the Stormwater Department to reduce the flow elevation through channel or flow conveyance structure improvements downstream.
    - (3) Obtain a flow easement from downstream property owners to the 10% point.
15. Tailwater Considerations. The hydraulic conditions downstream of a discharge pipe/culvert must be evaluated to determine a tailwater depth for a range of flow rates. At times, there may be a need for calculating backwater curves to establish the tailwater conditions. Tailwater considerations must be included in the narrative as well as the rationale for how it was determined. The following conditions must be considered:
- a. If the culvert outlet is operating with a free outfall, the critical depth and equivalent hydraulic grade line should be determined.
  - b. For culverts which discharge to an open channel, the stage-discharge curve for the channel must be determined.

- c. If an upstream culvert outlet is located near a downstream culvert inlet, the headwater elevation of the downstream culvert may establish the design tailwater depth for the upstream culvert.
- d. If the culvert discharges to a lake, pond, stream, river, or tidally influenced waterbody, the expected high water elevation of the particular waterbody may establish the culvert tailwater condition.
- e. If the hydraulic control is at the outlet, the water surface elevation or 0.8 times the pipe diameter (whichever is higher) is the outlet pipe hydraulic grade line.

### 3.3. Hydrologic Computation Methods

All hydrologic computations shall be completed using volume-based hydrograph methods acceptable to the Stormwater Department. The design storm duration for these computations shall be the **twenty-four (24) hour** storm event utilizing a SCS Type III distribution with a 0.1-hour duration time increment. A Peaking Factor of 323 shall be used for post-development flows and 256 for pre-development flows. Typical hydrologic inputs include, but are not limited to the following:

- Rainfall depth or intensity,
- NRCS soil classification and hydrologic soil group,
- Land use,
- Time of concentration, and
- Initial abstraction/surface storage.

The remainder of this section includes basic information for the hydrologic calculations. As discussed, the intent of the Manual is not to provide detail on every aspect of hydrologic computations, their limitations, assumptions, appropriateness of use, but rather general guidance on generally accepted standards. This Manual does, however, reference suggested materials as necessary for detailed discussions of related topics.

#### 3.3.1. Inputs

The precipitation depths/intensities corresponding to various return periods to be used for projects in Horry County can be found at NOAA's National Weather Service website at [http://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html?bkmrk=sc](http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=sc).

Soil types in Horry County range from sands to sandy clays. Existing soil types and corresponding runoff potential factors should be obtained from the site visit and other appropriate sources (i.e. the U. S. Department of Agriculture - Natural Resource Conservation Service website at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>).

#### 3.3.2. Drainage Design Methodologies

The Horry County recommended methods and corresponding design circumstances are listed

in Table 3.2 and 3.3 below. If other methods are used, applicant must submit in writing the following information to support the request in order to obtain written approval by the Stormwater Department:

1. Demonstrate that the request will not conflict with the purposes of this Manual, the Stormwater Management Ordinance or the regulatory requirements of Local, State, or Federal jurisdictions having authority;
2. Demonstrate extraordinary and exceptional conditions pertaining to the particular project;
3. Identify conditions that do not generally apply to other property in the vicinity;
4. Verify that the request will not be of substantial detriment to adjacent property or to the public good;
5. Provide technical documentation including testing, performance, or other data that supports the request.

**Table 3.2: Recommended methodologies based on land disturbance area**

Method	Size Limitations*	Comments
(Modified) Rational Method	0 – < 1 Acres	Acceptable for sizing individual culverts or storm drains that are not part of a pipe network or system. <b>Not to be used for storage design.</b>
“SCS Method” (TR-55)	0 – 2000 Acres	Used for estimating peak flows from urban areas.

\*Size limitations refer to the subwatershed size to the point where a stormwater system component (e.g., culvert, inlet, BMP) is located.

Details of and guidance on the Rational Method and Modified Rational Method can be found in Chow (1988), ASCE (1996), USDA (1996), and Mays (2001). Documentation on the commonly used SCS (or NRCS) Method can be found on the US Department of Agriculture website (<http://www.wcc.nrcs.usda.gov/hydro/hydro-tools-models-tr55.html>). The USGS regression equations for South Carolina can be obtained from the US Geological Survey website (<http://water.usgs.gov/osw/programs/nffpubs.html>). Haan, C. T., Barfield, B. J., and Hayes, J. C. (1995) and USDT (1996, 2001) can also be referenced for greater detail on hydrology calculations and assumptions.

Methods for calculating the time of concentration and abstraction are numerous. However, a minimum time of concentration of five (5) minutes shall be used for all hydrologic calculations. See references given above for the suggested methodologies for information on these calculations.

**Table 3.3: Recommended hydrologic methods for designing various stormwater management systems and controls**

Method	Rational Method	SCS Method
Large Watersheds		+
Storage/Sedimentation Facilities		+
Outlet Structures		+
Gutter Flow and Inlets	+	
Storm Drain Pipes	+	+
Culverts	+	+
Small Ditches		+
Open Channels		+
Energy Dissipation		+

### 3.3.3. Hydrographs

Hydrographs shall be used to evaluate entire systems by routing storm events through pipe or storage systems. The use of a hydrograph will provide modeling of the system performance rather than simply using the peak discharge. The Stormwater Department will accept commonly used computer models. New models may be accepted with appropriate documentation.

## 3.4. Water Quantity/Quality Control Standards

### 3.4.1. Water Quantity Design Standards

Water quantity control is an integral component of overall stormwater management. Quantity control is effectively flood control, reducing potential damages and health risks, but because uncontrolled runoff can cause erosion, it can also be a form of water quality control. The following design criteria are established for water quantity control. All storage facilities utilized for stormwater quantity control shall be designed to address runoff from the entire site when applying for a Horry County Stormwater Permit.

1. Controls shall be designed by a traditional reservoir routing procedure.
2. The post condition peak outflow for the 2, 10, 25, and 100-year 24-hour storm event must not exceed the peak outflow for the existing condition. The peak outflow for the 100-year 24-hour storm event must be provided. For projects greater than five (5) acres, stormwater management facilities shall be designed to reduce the twenty-five (25) year, 24-hour developed peak discharge rate by twenty (20) percent from the existing peak discharge rates.

3. All ponds shall have an emergency spillway or outlet designed to pass the 100-year, 24-hour design storm event if the storage capacity is exceeded.
4. All discharge points may be no closer than twenty (20) feet from the property boundary, where applicable.

A project may be eligible for a variance from the stormwater management requirements for water quantity control if the applicant can adequately address the items listed below. Final approval of a variance request will be given at the discretion of the Stormwater Department. A water quantity variance doesn't excuse water quality considerations. A project may be eligible for a variance from water quantity control if the following items are adequately demonstrated:

1. The proposed project will not create any significant adverse effects on the receiving stormwater system downstream of the property, and
2. The imposition of peak flow rate or volume control for stormwater management would create, aggravate, or accelerate downstream flooding or cause a detrimental impact to the downstream ecosystem.

### **3.4.2. Accepted Water Quantity Control Devices**

Detention structural controls are used for providing water quantity control and are typically used downstream of other minor structural controls. These structures are designed to provide channel protection, overbank flood protection, and protection against adverse downstream impacts that are related to the increase in peak flow rates and flow volumes from a development or re-development project. Structural detention stormwater controls accepted by Horry County are shown in Table 3.4.

### **3.4.3. Water Quality Design Standards**

Water quality control is an integral and required component of overall stormwater management systems. Redevelopment as well as new development projects must include controls that treat or otherwise limit the discharge of pollutants. These requirements have been added due to new local, state and federal requirements, but also due to the need to improve and preserve the water resources in Horry County. Background information and references are provided in the sections below, followed by the design standards for addressing water quality.

The following design criteria are established for water quality control and must be incorporated in one or more BMPs for a given sub basin. In the case of redevelopment projects, the design standards will be required for the improved area instead of the entire site. Incorporation of the following requirements shall constitute adequate control of the discharge of pollutants.

**Table 3.4: Accepted Quantity Controls**

<b>General Structural Control</b>	<b>Description</b>
<b>Dry Detention/Dry Extended Basins</b>	Dry detention basins and dry extended detention basins are surface storage facilities intended to provide temporary storage of stormwater runoff and releasing it at a designed flow rate to reduce downstream water quantity impacts. These structures are designed to completely drain to a dry condition within 72 hours. Applicant is to verify the existing water table through a third party geotechnical analysis.
<b>Wet Stormwater Detention Basins</b> <ul style="list-style-type: none"> <li>• Wet Pond</li> <li>• Wet Extended Detention Pond</li> <li>• Multiple Pond System</li> </ul>	Wet detention basins are constructed stormwater basins that have a permanent pool of water. Runoff from each rain event is detained above the permanent pool and released at a designed flow rate to reduce downstream water quantity impacts. The minimum depth of a permanent pool is required to be 6 feet and the maximum depth is 10 feet.
<b>Multi-purpose Detention Areas</b>	Multi-purpose detention areas are used for one or more specific activities such as parking areas and rooftops. These areas are used to provide temporary storage of runoff. Some of the multi-purpose areas such as infiltration trenches or bio-retention cells may also be used for water quality purposes.
<b>Underground Detention</b>	Underground detention is used as an alternative to surface dry-detention basins. They are used in areas that are space-limited where there is not enough adequate land to provide the required detention volume. Underground storage utilizes tanks, vaults, and buried pipes to supply the required storage volume. Applicant is to verify the existing water table through a third party geotechnical analysis.
<b>Infiltration Basins</b>	Infiltration basins are used to remove runoff from the flow path into the ground. They are used in areas that currently do not discharge stormwater or create runoff only during large storm events.

All sites which disturb one-half (1/2) acre or greater shall include best management practices (BMPs) to address water quality.

- Wet ponds designed to catch the first ½” of runoff from the entire area draining to the pond and release it over at least a 24-hour period
- Dry ponds designed to catch the first 1” of runoff from the entire area draining to the pond and release it over at least a 24-hour period
- Infiltration Practices designed to accept, at a minimum, the first 1” of runoff from all impervious areas and designed in accordance with S.C. Reg. 72-307.C(11)
- For areas not draining to a pond or infiltration practice, show how permanent water

quality requirements were addressed (1) inch of runoff from the built upon area, whichever is greater, can be stored onsite when permanent water quality ponds having a permanent pool are proposed for the project. Projects with stormwater outlets draining within 1000 feet of shellfish beds need to retain the first 1.5 inches of runoff on site.

- Water quality orifices should be a size that is conducive to proper operation and maintenance. Orifices less than 3” in diameter are prone to clogging
- Projects located within one-half (1/2) mile of a receiving water body in the Coastal Zone must meet Section III.C.3.XIII.A of the Coastal Zone Management Program Refinements (CZMP). Designs must show that the first ½ inch of runoff from the entire site or the first one
- Receiving Water Body” as it relates to additional Coastal Zone stormwater management requirements is also known as a “Coastal Receiving Water” and means all regularly tidally influenced salt and fresh water marsh areas, all lakes or ponds which are used primarily for public recreation or a public drinking water supply, and other water bodies within the coastal zone, excluding wetlands, swamps, ditches and stormwater management ponds which are not contiguous via an outfall or similar structure with a tidal water body

#### 3.4.4. Standard Design Procedures for Water Quality BMPs

1. Determine an appropriate, accepted BMP(s) needed for the site, considering the land use, pollutants of concern (Table 3.5), soils, maintenance requirements, and location in relation to Waters of the State and any impairment that may exist.
2. Low impact development (LID) BMPs should be considered when applicable. LID practices can require less structural conveyance systems therefore reducing the construction cost while at the same time maintaining water quality and quantity standards.
3. If the receiving water of the project is impaired or has an adopted TMDL, the applicant must show that water quality standards are being met and designated uses are not impacted. This proof must be a quantitative and qualitative analysis for sites which disturb greater than twenty-five (25) acres.

#### 3.4.5. Detention Ponds/Reservoirs Standards

The following criteria shall be followed in the design of any detention pond/reservoir BMP.

1. Ponds with vegetated embankments shall be less than fifteen (15) feet in height and shall have side slopes (inside and outside) no steeper than 3H:1V. Ponds with a littoral shelf shall have a minimum of 3:1 side slopes. Ponds without a littoral shelf will require a minimum of a 5:1 slope from the top of bank (TOB) to the normal water level and slopes below the water level must be a minimum of 3:1 to the bottom of the pond.
2. The minimum width is twenty-four (24) feet at the normal water level.

3. The flow path between the pond inlet and outlet must be maximized to ensure sufficient time to allow for sedimentation of pollutants
4. A minimum freeboard of one (1) foot above the twenty-five (25) year, twenty-four (24) hour design storm high water elevation shall be provided for all impoundments and/or ponds.
5. Permanent stormwater ponds shall have a minimum 0.5-ft freeboard from the top of bank for the 100-year storm event.
6. The bottom of dry detention ponds shall be graded towards the outlet structure(s) to prevent standing water conditions with a minimum 1% bottom slope or shall have underdrains.
7. The maximum depth of permanent storage facilities with a permanent pool shall be determined by site conditions, design constraints, and environmental needs but shall never be less than six (6) feet. The facility should provide a permanent pool of water with a depth sufficient to discourage weed and mosquito growth without creating undue potential for anaerobic bottom conditions. Aeration (preferably through bottom bubblers) or other means can be used as necessary to prevent anaerobic conditions for ponds less than one half (1/2) acre in size.
8. Wet detention ponds with drainage areas greater than 30 acres (including areas from interconnected ponds) should have the capability to be drained down a minimum of 12 inches from normal pool elevation without the need for mechanical pumping.

Wet detention ponds with drainage areas from 15 – 30 acres, should have the capability to be drained down a minimum of 12 inches from normal pool elevation without the need for mechanical pumping or may provide 20% reduction in peak discharge for the 100-year storm event at the boundary location the pond drains to.

Wet detention ponds with drainage areas less than 15 acres are not required to be drained down.

9. Pond embankments constructed with/on fill shall include notes for satisfactory compaction testing (95% SP). Compaction test results must be submitted with as-builts.
10. Pond embankments constructed on fill shall have a top width no less than 8-ft.

### **3.4.6. Infiltration Standards**

The following criteria shall be followed in the design of any BMP utilizing infiltration.

1. Infiltration devices shall be required on those sites which do not currently discharge stormwater runoff or have no existing outlet. In such cases, in the post-development condition, infiltration practices shall be designed to accept, at a minimum, the first inch of runoff from all impervious areas. For evaluating the ten (10) year and twenty-five (25) year storm events, the discharge rate from the site shall be limited to (not exceed) that of



a site of equivalent size and slope with a SCS Curve Number equal to 39. As with detention ponds, the response of the system to the one hundred (100) year storm event must be analyzed, but only to the extent that no structure flooding or damage results.

- a. Testing shall be conducted by a qualified professional such as a professional engineer, soils scientist, or geologist in accordance with the standards contained in Appendix B of *Low Impact Development in Coastal South Carolina: A Planning and Design Guide* (2014).
- b. The design infiltration rate should be equal to one-half the infiltration rate found from the soil textural analysis.
- c. Water table estimation should be based on the first occurrence of two chroma features.
- d. Infiltration device design shall be based on soils characteristics of the first two (2) feet below the proposed bottom of the device (not necessarily the first two (2) feet below ground surface).
- e. Areas draining to these practices must be stabilized and vegetative filters established prior to runoff entering the system. Infiltration practices shall not be used if a suspended solids filter system does not accompany the practice. If vegetation is the intended filter, there shall be at least a twenty (20) foot length of vegetative filter prior to stormwater runoff entering the infiltration practice. Forebays or other engineered devices for sediment removal may be prudent.
- f. Each system shall be designed to prevent clogging by fine material and for ease of maintenance.
- g. The bottom of the infiltration practice shall be at least six (6) inches above the “zone of seasonal saturation” and infiltration interface.
- h. The infiltration practice shall be designed to completely drain off water within seventy-two (72) hours.
- i. Soils must have adequate permeability to allow water to infiltrate. Infiltration practices are limited to soils having an infiltration rate of at least 0.30 inches per hour. If the infiltration rate is greater than 0.30 inches but less than 4.0 inches per hour, then an underdrain system must be installed. Initial consideration will be based on a review of the appropriate soil survey, and proposed depths of excavation. The survey may serve as a basis for rejecting approval of using an infiltration device. On-site soil borings and textural classifications must be accomplished to verify the actual site and seasonal high water table conditions when infiltration is to be utilized.
- j. Infiltration practices greater than three (3) feet deep shall be located at least ten (10) feet from foundation walls.
- k. Infiltration practices designed to handle runoff from areas with a high runoff potential

shall be a minimum of one hundred fifty (150) feet from any public or private water supply well.

- l. The design of an infiltration practice shall have a properly sized overflow or bypass for larger storm events. Measures to provide a non-erosive velocity of flow along its length and at the outfall shall also be included as necessary. Additional control devices will typically be necessary prior to release to a watercourse to meet water quality requirements.
- m. The slope of the bottom of the infiltration practice shall not exceed five (5) percent. Also, the practice shall not be installed in fill material as piping along the fill/natural ground interface may cause slope failure.
- n. An infiltration practice shall not be installed on or atop a slope whose natural or existing angle of incline exceeds twenty (20) percent.
- o. Clean outs will be provided at a minimum of every one hundred (100) feet along the infiltration practice to allow for access and maintenance.
- p. In cases where such criteria or limitations make the use of infiltration devices inappropriate, but no discharge currently leaves a given site, runoff control must be provided by some other measure. The Stormwater Department shall be contacted for guidance on the appropriate controls to employ or other mutually accepted best management practices.

### 3.4.7. Underground Detention Devices

Underground detention facilities shall be designed using the following criteria:

- a. If using infiltration practices, refer to the design criteria in section 3.4.6 Infiltration Device Standards.
- b. Underground detention systems are to be located downstream of other stormwater controls providing treatment of the water quality volume.
- c. The maximum contributing drainage area to be served by a single underground detention vault or tank is five (5) acres.
- d. All systems shall be designed and laid out to facilitate maintenance. Systems should be cleaned out (sediment removal) at least once a year, but more frequently, if necessary. As with all stormwater controls, a maintenance plan and schedule shall be developed and included on the as-built plans.
- e. The minimum pipe diameter for underground detention tanks is thirty-six (36) inches or equivalent.
- f. Underground detention systems must meet structural requirements for overburden support and traffic loading if appropriate.

- g. Access must be provided over the inlet pipe and outflow structure. Access openings can consist of a standard frame, grate and solid cover, or preferably a removable panel.
- h. All underground detention systems should accommodate at least six (6) inches of sediment storage in the volume calculations.

The volume within any structure used for water quantity control shall be drained from the structure within seventy-two (72) hours.

### 3.4.8. Accepted Water Quality BMPs

In selecting a BMP(s), it is most important to know what pollutants need to be removed, how to remove them, and what degree of removal is needed to meet water quality goals. BMPs are expected to reduce pollutant loads to receiving waters, reduce erosion, provide health and safety benefits, and be cost effective.

The varieties of water quality BMPs are numerous and are typically considered either structural or non-structural. Horry County’s current approved lists of stormwater quality BMPs, listed in Table 3.5 are based on literature reviews and experience. Some references to BMP selection, effectiveness, and design can be found in the SCDHEC BMP Handbook (2005), Agricultural Resource Council (2001), Schueler (1987), Water Environment Foundation (WEF) & American Society of Civil Engineers (ASCE) (1998), and the Low Impact Development of Coastal South Carolina: A Planning and Design Guide (2014).

**Table 3.5: Accepted Water Quality Controls (BMPs)**

General Structural Control	Description
<b>Wet Ponds</b>	Wet stormwater ponds are constructed stormwater basins that have a permanent pool of water. Runoff from each rain event is detained and treated in the pool, and released at a designed rate.
<b>Stormwater Wetlands</b>	Stormwater wetlands are constructed systems used for stormwater management. Stormwater wetlands consist of a combination of shallow marsh areas, open water and semi-wet areas above the permanent water surface.
<b>Rainwater Harvesting</b>	Rainwater harvesting is the accumulation and deposition of rainwater for reuse on-site, rather than allowing it to run off.
<b>Bioretention Areas<sup>1</sup></b>	Bioretention areas are shallow stormwater basins or landscaped areas that utilize engineered soils and vegetation to capture and treat stormwater runoff. Runoff may be returned to the conveyance system or partially exfiltrated into the soil.
<b>Green Roofs</b>	A green roof or living roof is a building roof that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. It may include additional layers such as a root barrier and drainage and irrigation systems.

<b>Sand Filters</b> <sup>1</sup>	Sand filters are multi-chamber structures designed to treat stormwater runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrated into the soil.
<b>Infiltration Trenches</b> <sup>1</sup>	An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of stormwater runoff into the surrounding soils from the bottom and sides of the trench.
<b>Enhanced Grassed Swales</b> <sup>1</sup>	Enhanced swales are vegetated open channels that are explicitly designed and constructed to capture and treat stormwater runoff within dry or wet cells formed by check dams or other structures.
<b>Engineered Devices</b> <sup>2</sup> <ul style="list-style-type: none"> <li>• Vortex Separator</li> <li>• Baffles</li> <li>• Cartridges</li> <li>• Skimmers</li> <li>• Tree/Shrubbery Boxes</li> <li>• Gravity Oil-Grit Separator</li> <li>• Filter Material</li> <li>• Inlet inserts</li> </ul>	Pre-fabricated controls use the movement of stormwater runoff through a specially designed structure to remove target pollutants. They are typically used on smaller commercial sites and urban hotspots. There are numerous commercial vendors, but limited data on the performance of these structures. Until further research is done and substantial removal efficiencies are published, these structures may require monitoring. Some of the popular vendors/products include but are not limited to Crystal Stream, Vortech, Aquashield, Filterra, Stormceptor, Stormfilter, CDS, BaySaver, and Downstream Defender <sup>2</sup> . This is by no means a complete list and the Stormwater Department will evaluate any such device if included in designs, provided evidence is provided as to its effectiveness. Such evidence must include applicability and proof of third-party testing on trapping efficiencies.

<sup>1</sup> This is an infiltration design and must meet infiltration standard requirements.

<sup>2</sup> This list is not intended as preference for these devices nor to exclude others.

Some structural BMPs have limited applications and are recommended to be used in conjunction with other BMPs. Limited application controls may be used within a system of water quality controls and are very effective pre-treatment structures for the controls listed in Table 3.5. Limited application structural controls may be designed and used only in development situations where regular maintenance is guaranteed. Popular limited stormwater controls are shown in Table 3.6.

**Table 3.6: Limited Structural Controls (BMPs)**

Limited Structural Control	Description
<b>Vegetated Filters</b> <ul style="list-style-type: none"> <li>• Filter Strip</li> <li>• Grassed Channels and Swales</li> </ul>	Both filter strips and grassed channels provide filtering of stormwater runoff as it flows across the vegetation. However, by themselves these controls do not consistently obtain adequate sediment and pollutant removal. Both filter strips and vegetated channels shall be used as pretreatment measures or part of a treatment system approach.

<p><b>Submerged Gravel Wetland Systems</b></p>	<p>Submerged gravel wetlands use wetland plants in a submerged gravel or crushed rock media to remove stormwater runoff pollutants. These systems should only be used in mid- to high- density environments where other structural controls will be utilized.</p>
<p><b>Small Sand Filters</b></p> <ul style="list-style-type: none"> <li>• Surface Sand Filter</li> <li>• Perimeter Sand Filter</li> </ul>	<p>Sand filters are multi-chamber structures designed to treat stormwater runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrated into the soil.</p>
<p><b>Porous Paver Systems</b></p>	<p>Porous paver systems consist of open void paver units laid on gravel subgrade to promote stormwater infiltration. Porous pavers provide water quality and quantity benefits.</p>

Regardless of the type of control, maintenance plans and schedules shall be developed for each BMP and included on the as-built plans.

Listed below are some non-structural BMPs that are encouraged for use in larger construction activities and re-development projects.

1. **Buffers:** an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of the buffer is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment.
2. **Disconnected roof drains/impervious areas:** directing stormwater runoff from rooftops towards pervious areas where it is allowed to filter through vegetation and other landscaped material and infiltrate into the soil.
3. **Grass/Porous pavements:** allows for the reduction of paved areas by implementing areas that are infrequently used, providing water quality benefits through increased infiltration. Should be avoided in high traffic areas.
4. **Cluster development:** concentrate development away from environmentally sensitive areas such as streams, wetlands, and mature wooded areas with an emphasis on preservation of these sensitive areas.
5. **Literature for owners and HOAs** to educate and train themselves and homeowners on the impact they can have on water quality and the activities necessary to maintain structural controls. These efforts are particularly critical in LID designs.

### 3.4.9. Low Impact Development (LID) Concepts

A site incorporating LID design generally produces a much smaller peak rate and volume of runoff than traditional stormwater management methods. In a traditional design, the increased rate and volume of runoff is concentrated into pipes conveyed and detained in a single large structure typically at the “end-of-pipe” situation. In an LID approach, stormwater runoff is

managed near the source (“source-controlled”) in a number of small, landscaped features. These features encourage infiltration, lengthen the time of concentration, and retain flow to create a hydrologic landscape functionally equivalent to the pre-development conditions. These source treatment structures should ideally connect to natural drainage ways. The goal of LID is to combine this hydrologically functional site design with pollution prevention integrated management practices (IMPs) to reduce the impacts of development on the quality and quantity of runoff. The term IMP is used in place of BMP or best management practices as IMPs are integrated throughout the development providing source treatment as well as landscape amenities. Additional information on LID IMPs can be found in the Low Impact Development of Coastal South Carolina: A Planning and Design Guide (2014). Some examples of LID site planning considerations are listed below:

- Maintain natural drainage patterns.
- Direct runoff to depressed areas for infiltration.
- Preserve existing trees.
- Reduce impervious areas.
- Locate IMPs in soils with the highest permeability.
- Disconnect impervious area from one another.
- Limit clearing and grading as much as possible.
- Locate impervious areas on less permeable soils.
- Maintain existing natural terrain and avoid construction in steep slope areas (>15%).
- Preserve tree canopy and natural vegetative buffers.
- Re-vegetate cleared and graded areas.
- Avoid concentrating flow into pipes or channels.

To assess the hydrologic functionality of a site, designers use the curve number (CN), time of concentration (Tc), and other factors. By maintaining the pre-development values of these parameters, a developed site will behave similarly to its pre-developed condition. This will allow the designer to meet stormwater management requirements as well as reduce any potential impact to downstream environments and properties.

#### 3.4.9.1. **Runoff**

The CN is used to determine the volume of runoff from a site. For developed LID sites, the design should emulate the runoff characteristics of the pre-developed condition, in essence maintaining the same curve number.

Removal of land cover can increase the amount of runoff from a site by reducing infiltration. Therefore, reduction of land cover changes is the first step in limiting changes to the CN. There are a number of ways to reduce changes in land cover, including:

- Reduce the size of cleared areas (i.e. preserve as much woodland as possible) and increase reforestation areas.
- Locate cleared/graded areas outside permeable soils and vegetated areas.
- Design roads, sidewalks, and parking areas to minimize land cover impacts.
- Reduce or disconnect site imperviousness.

### 3.4.9.2. Reduce Limits of Clearing and Grading

The limits of clearing and grading refer to the boundaries of the site to which development is directed. This development area will include all impervious areas such as roads, sidewalks, rooftops, graded lawn areas and open drainage IMPs. To reduce the change in land cover and minimize hydrologic impact to the existing site, the development area should be located where impact on the predevelopment CN is less sensitive (e.g., on barren C and D type soils which will have less impact than developing forested A and B type soils).

### 3.4.9.3. Preserve Permeable Soils and Vegetated Areas

Addition of impervious surfaces and compaction due to construction traffic over soils creates the greatest possible change in infiltration (e.g. CN) between pre- and post-development conditions. Therefore the preservation of existing soils should be promoted in all unpaved areas throughout the site. Areas with well drained soils are generally good sites for bioretention areas and help sustain groundwater recharge and stream base flows.

Preservation of woodland areas can help reduce impacts on existing land cover. Woodland areas promote infiltration, distribute flow, reduce velocities, provide wildlife habitat, and help maintain stream bank and bed stability. Saving existing trees on a development site is a cost- effective and quality-enhancing practice. Expansion of vegetated areas adds to the benefits of preservation by further reducing CN changes. Trees and other native species should be kept in groups large enough to maintain soil moisture, sunlight, wind and other growth characteristics. Retaining mature trees of a single species is seldom successful (Hinman, 2005). For best results flag tree preservation area at least three (3) feet outside of the existing edge of tree canopy.

### 3.4.9.4. Time of Concentration

Time of concentration ( $T_c$ ) describes the time it takes for runoff to flow from a site's most hydrologically remote point to the outlet. The time of concentration in conjunction with the CN determines the peak discharge rate for a storm event. The time of concentration is a function of flow velocity which in turn is affected by:

- Travel distance (flow path)
- Slope of the ground and/or water surface
- Ground surface roughness
- Channel shape and pattern

These factors can then be manipulated to modify the  $T_c$  of an LID site by modifying the following aspects of the flow:

- Maximize sheet flow
- Modify/ lengthen flow path
- Site and lot slopes
- Open swale geometry
- Site and lot vegetation (roughness)

Sheet Flow: The site should be graded to maximize overland sheet flow distance and minimize the disturbance of woodlands along the Tc flow path. Where graded areas flow to natural drainage ways, velocities should not exceed one (1) ft/sec to the extent practicable, as faster velocities may provide insufficient contact time for settlement of suspended solids. The installation of a stable, level spreader along the upland edge of the natural drainage way buffer, or flat grassy area about thirty (30) feet wide upland of the buffer will allow the runoff to spread out.

Flow Path: Increasing the flow path or travel distance will increase the time of concentration and allow more time for infiltration reducing not only the peak flow but the total volume of runoff as well. In residential areas, rooftop and driveway runoff can be permanently infiltrated or stored within infiltration trenches, dry wells, or cisterns strategically located to capture the runoff prior to it reaching the lawn. Strategic lot grading can increase both the surface roughness and the travel length of the runoff lengthening the time of concentration along that particular flow path. A maximum flow path of 300 feet is typically recognized as the limit of sheet flow before conversion to concentrated flow.

Site and Lot Slopes: Flatten lot slopes to approach a maximum of one (1) percent. This will increase infiltration and travel time. While codes may require a positive drainage perimeter around the building, lot areas outside the pad should contain at least one (1) percent positive slope. Also, soil compaction of original soils (not fill) in the lot should be avoided to maximize infiltration.



Open Swales: Open drainage conveyances are preferred in LID designs over conventional storm drainage structures. To alleviate flooding problems, vegetated or grassed open drainage IMPs should be provided as the primary means of conveying surface runoff between lots and along roadways. Swales can be made wider and flatter to decrease velocity and increase  $T_c$ . Infiltration can be used to reduce the quantity of the surface runoff as the need arises. The site should be graded as to minimize the quantity and velocity of surface runoff within the open drainage IMPs. All open swale systems should be located within drainage easements to ensure long-term maintenance.

Site and Lot Vegetation: Re-vegetate and/ or plant areas to promote natural retention and increase travel time. Re-vegetating graded areas or preserving existing vegetation can reduce peak discharge by increasing surface roughness. Connecting vegetated buffer areas with existing vegetation or forest allows designers to avoid “paved areas” as the  $T_c$  flow path for the “shallow concentrated flow” part of the  $T_c$  calculation. The benefits of these practices minimize the need for bioretention facilities.

In summary, a site  $T_c$  is very important in determining the peak rate of runoff that will occur during a rain event. LID techniques help to reduce  $T_c$ . Table 3.8 summarizes which LID techniques affect the factors governing the  $T_c$ .

#### 3.4.9.5. LID Hydrologic Analysis

The goal of LID is to create a post-development landscape that has similar hydrologic functionality to the pre-developed site. This is done by minimizing the post-development CN and  $T_c$  as much as possible and using a number of small scale retention structures near sources of increased runoff to make up the difference in runoff volume and peak rate between the pre- and post-developed conditions. The LID design approach focuses on the following hydrologic analysis and design components:

CN: Minimizing change in the post-development CN by reducing impervious areas, preserving trees, meadows and well drained areas to reduce storage requirements.

$T_c$ : Maintaining the pre-development  $T_c$  to minimize the increase in peak runoff rate by lengthening flow paths and reducing the length of conveyance systems

Retention: Providing retention storage for volume, peak and water quality control, near the source of increased runoff.

Detention: Providing additional detention storage, if required, to maintain peak runoff control and prevent flooding.

Table 3.9 provides a summary of LID techniques that can be used to manipulate the above design and analysis components.

**Table 3.8: LID Planning Techniques to Increase Post-development Tc**

LID Objective	Disconnect Impervious Areas	Wider and Flatter Swales	Maintain Sheet Flow	Clusters of Trees and Shrubs in Flow Path	Provide Tree Conservation Zones	Minimize the Use of Storm Drain Pipes	Preserve Existing Topography	Provide for Bioretention
Minimize disturbance	X		X	X	X	X	X	
Flatten grades		X	X			X	X	X
Reduce height of slopes						X	X	
Increase flow path	X	X	X	X		X		
Increase roughness	X		X	X	X	X		X

\*Adopted from (MDDNR, 1999)

**Table 3.9: LID Techniques for use with Design and Analysis Components**

LID Hydrologic Design and Analysis Components	Flatten Slope	Increase Flow Path	Increase Sheet Flow	Increase Roughness	Minimize Disturbance	Flatten Slopes On Swales	Infiltration Swales	Vegetative Filter Strips	Constricted Pipes	Disconnected Impervious Areas	Reduce Curb And Gutter	Rain Barrels And Cisterns	Rooftop Storage	Bioretention	Revegetation	Vegetation Preservation
Lower Post-development CN					X		X	X		X	X			X	X	X
Increase Tc	X	X	X	X		X		X	X	X	X	X	X	X	X	X
Retention							X	X				X	X	X	X	X
Detention						X			X			X	X			

### 3.4.9.6. Low-Impact Development Integrated Management Practices (LID IMPs)

Low-impact development uses distributed source control techniques to achieve the desired post-development hydrologic conditions. The previous sections highlight how site planning techniques can be used to minimize hydrologic effects of development; as well as, assess the need for storage due to increases in runoff volume, or peak rate. LID IMPs are used to satisfy these storage volume requirements. The design goal is to locate the IMPs at the source or lot, ideally on level ground within individual lots of the development or providing a green space connection to existing woodlands. Management practices that are suited to low-impact development include:

- LID-01 Green Roofs
- LID-02 Rain Barrels, Cisterns, & Dry Wells
- LID-03 Pervious Pavement
- LID-04 Planter Box
- LID-05 Driveways
- LID-06 Vegetated Swales
- LID-07 Full Dispersion
- LID-08 Urban LID Applications
- LID-09 Disconnect Impervious and Green Space Preservation

### 3.4.9.7. LID Integrated Management Practices (IMP) Selection Process

The selection and design process must be conducted to meet all the constraints and design considerations for a particular project. It is up to the developer's/designer's judgment to decide which design is the most appropriate for their particular site and land use.

Hydrologic functions such as infiltration, frequency and volume of discharges, and groundwater recharge become essential considerations when identifying and selecting LID IMPs as well as more traditional stormwater management BMPs. In addition, there are a number of site conditions that need to be considered to effectively design and install BMPs. Table 3.10 provides a summary of the feasibility factors listed below.

- Contributing Drainage Area (CDA): Volume of water received by a practice can affect BMP performance. This column indicates the contributing drainage areas that typically apply for each BMP.
- Slope: This column indicates the maximum or minimum slope on which a BMP should be installed.
- Minimum Head: This column provides an estimate of the minimum amount of elevation difference needed within the BMP, from the inflow to the outflow, to allow for gravity operation.
- Minimum Depth to Seasonal High Water Table: This column indicates the minimum distance that should be provided between the bottom of the BMP and the top of the water table.

- Soils: This column describes the influence that the underlying soils (i.e. hydrologic soil groups) can have on the performance of the stormwater BMP.

**Table 3.10: Site Feasibility Limitations of BMPs**

BMP	Contributing Drainage Area (CDA)	Slope	Minimum Head	Minimum Depth to Water Table	Soils
Bioretention	Up to 5 acres	Up to 5% <sup>2</sup>	2.5 – 4 feet	0.5 feet	All soils <sup>3</sup>
Permeable Pavement	Up to 5 times practice surface area	Up to 5%	2 – 4 feet	0.5 feet	All soils <sup>3</sup>
Infiltration	Up to 5 acres	Up to 5% <sup>2</sup>	2 – 4 feet	0.5 feet	Must drain within 72 hours
Green Roof	Green roof area +25%	No limit	N/A	N/A	N/A
Rainwater Harvesting	No limit	No limit	N/A	N/A	N/A
Disconnection	Up to 1,000 ft <sup>2</sup> per downspout	Up to 5%	N/A	N/A	All soils
Open Channels	Up to 5 acres	Up to 5% <sup>2</sup>	1 – 2 feet	0.5 feet	All soils
Filtration	Up to 10 acres	Up to 5%	2 – 4 feet	0.5 feet	All soils
Dry Ponds	No limit	Up to 15%	4 – 8 feet	0.5 feet	All soils
Wet Ponds	Greater than 10 acres <sup>1</sup>	Up to 15%	4 – 8 feet	No limit	Slow-draining soils preferred
Stormwater Wetlands	Greater than 10 acres <sup>1</sup>	Up to 15% <sup>2</sup>	2 – 5 feet	No limit	Slow-draining soils preferred

<sup>1</sup>CDA can be smaller if practice intersects the water table.  
<sup>2</sup>Check dams may be necessary to create sufficient ponding volume.  
<sup>3</sup>Slow-draining soils may require an underdrain.

Adopted from Low Impact Development in Coastal South Carolina: A Planning and Design Guide (2014)

### 3.4.10 Stormwater Manufactured Treatment Devices (MTDs)

Manufactured Treatment Devices (MTDs) function as stormwater treatment devices before stormwater runoff is discharged off-site or to receiving water bodies, and may be incorporated into a series of water quality best management practices to remove pollutants from stormwater runoff. MTDs are not designed, or intended to store a volume of water for water quality treatment. MTD Pollutant removal efficiencies are variable and are highly dependent on storm size, influent pollutant concentrations, rainfall intensity and other factors. The S. C. Department of Transportation (SCDOT) has developed Supplemental Technical Specifications for Stormwater MTDs (SCDOT Designation: SC-M-815-13) as well as a Qualified Products Policy 78 program to achieve designation as an approved Manufacturer/Supplier of MTD products.

The Supplemental Technical Specifications for Stormwater MTDs, the Qualified Product Policy and the Qualified Product List can be found at the following links, respectively, and should be referred to when designing and installing MTDs:

[http://www.scdot.org/doing/technicalPDFs/supTechSpecs/Stormwater\\_Manufactured\\_Treatment\\_Device\\_08\\_13.pdf](http://www.scdot.org/doing/technicalPDFs/supTechSpecs/Stormwater_Manufactured_Treatment_Device_08_13.pdf),

[http://info.scdot.org/Construction\\_D/QualifiedProductPolicies2/78%20QPP%20101415.pdf](http://info.scdot.org/Construction_D/QualifiedProductPolicies2/78%20QPP%20101415.pdf) and  
[http://info.scdot.org/Construction\\_D/QualifiedProductList2/78%20QPL%20040716.pdf](http://info.scdot.org/Construction_D/QualifiedProductList2/78%20QPL%20040716.pdf).

MTDs are designed to filter and trap trash, sediment, totals suspended solids (TSS), oil and grease, metals, hydrocarbons and other pollutants. MTDs often combine settling, filtration, and various biological processes into one controlled system. The following MTD types may be considered for projects in Horry County:

- MTD Type 1 - Separation Devices (Standard Stormwater MTD)
- MTD Type 3 - Catch Basin Inserts (Unique Project requirements)

### **Design Criteria**

MTD Type 1 (separation devices, also referred to as hydrodynamic separators) must be designed and sized to treat, at a minimum, the stormwater runoff from the 1.8-inch, twenty-four (24) hour, SCS Type III storm event, to prevent pollutants from being transported downstream. MTD Type 1 and MTD Type 3 must be designed to treat, at a minimum, the first one (1) inch of runoff from the site's disturbed area. This is defined as the water quality event (WQE). MTDs are to be designed to treat the entire water quality event (WQE) with no by-pass for a minimum 80% Total Suspended Solids (TSS) removal efficiency. Ensure tail water conditions are accounted for in the MTD design.

### **Drawing Requirements**

As part of the permit submittal, applicants must submit Working Drawings, Material Certification, and Certification that the MTD meets the requirements of this Specification to the Stormwater Department. Ensure the Working Drawings contain at a minimum, MTD name and model and/or serial number, MTD dimensioning, MTD and storm sewer invert elevations, installation drawings, and instructions that completely describe the MTD bearing the seal and signature of a South Carolina registered Professional Engineer.

## **3.5 Stormwater Drainage System Design Standards**

This section provides the design requirements for various storm sewer drainage/collection system components including design storms, velocities, pipe and inlet sizes. Storm drainage systems shall include all storm drainage structures and pipes that convey runoff under roadways. These systems are commonly referred to as lateral closed systems. These standards are required for all public and private stormwater management systems. All lateral closed systems must be installed as per South Carolina Department of Transportation (SCDOT) specifications.

1. Storm drain pipes:
  - a. Storm drainage lines shall be staked at each box or at intervals that will be sufficient to check alignment and grade of the construction with the approved plans. The use of lasers to augment control is encouraged.
  - b. The minimum size storm drainage pipe allowable shall be fifteen (15) inches in diameter.
  - c. The maximum hydraulic gradient should not produce a velocity that exceeds 15 feet per second.
  - d. The minimum physical slope should be 0.5 percent, if feasible, however regardless of the slope, the minimum velocity shall be three (3) feet per second when the storm sewer is flowing ½ full, except where specifically approved in writing by the Stormwater Department. Maximum allowable slope for storm drainage pipe is twenty (20) percent.
  - e. Drainage system installation must be such that stormwater discharge is not concentrated on adjacent property owners and that the velocity is less than erosive limits for the site soils. At pipe outfalls, this normally requires the use of a riprap apron, placed on filter fabric, for a minimum distance equal to or greater than six (6) pipe diameters.
  - f. A minimum of one (1) foot of cover shall be provided for all RCP storm drainage pipes under unpaved roads or any other situation in which no roadway or other structure is to cover the pipe or unless otherwise stated by a pipe manufacturer.
  - g. For pipes under any paved surface, the minimum cover is six (6) inches, excluding base and surface course depth. Contact the Stormwater Department for minimum depths in other situations (e.g. other pipe types). RCP Class IV or V pipe may be requested by the Stormwater Department in special conditions and must be specifically approved in writing by the Stormwater Department.
  - h. All drainage piping shall be RCP class III as a minimum beneath traffic bearing areas such as roadways and driveways or inside a right-of-way. Double-walled, smooth interior corrugated plastic pipe (CPP) is acceptable in other areas if sufficient cover is provided. All pipe shall be backfilled with suitable material and compacted in lifts as specified by the manufacturer. All joints shall be wrapped in filter fabric prior to backfilling.
  - i. Storm drainage pipe shall be placed to minimize length running under pavement. Where it is necessary for pipe to cross the roadway, it preferably shall be placed at a ninety (90) degree angle, and in no case at less than thirty (30) degrees. All cross lines in the roadway shall be compacted in six (6) inch lifts to ninety-five (95) percent Standard Proctor maximum density and to ninety-eight (98) Standard on the last six (6) inches.
  - j. Any storm drainage pipe shall extend out to or beyond the toe of the roadway embankment; in no case will the end of the pipe be within the five foot roadway shoulder.
  - k. Storm drainage pipe discharging into a drainage channel shall intersect the channel in a manner such that the interior angles measured from their centerlines of flow, is greater than, or at most equal to ninety (90) degrees. Rip-rap, or other suitable protection, is required from the outlet point to the bottom of the channel and on the opposite channel bank to prevent scour and erosion.

- l. Wherever feasible, storm drainage pipe discharging into a wet pond or lake should have the discharge invert above the permanent pool elevation and rip-rap or other energy dissipation structures shall be placed from the bottom of the outlet to one foot below the normal permanent pool level. Where pipe is installed to serve as a connection between ponds, such pipe shall be submerged below normal permanent pool level to allow ponds to be lowered by a minimum of 12 inches and no more than 4 catchments are connected to such pipe.
  - m. Hydraulic grade line (HGL) and head loss calculations for determining water surface elevations shall be performed for all systems connections. The 25-year HGL shall be calculated for all storm drains and a profile shown on the plans indicating that the 25-year hydraulic gradient shall stay within the grate of the inlet. Models should be run based on setting the pond level at the 25-year storm event (i.e. assume the pond is full at the 25-year stormwater calculation). Calculations shall be provided in the Stormwater Report.
  - n. Calculations shall be performed for the appropriate design storm event.
  - o. For storm drainage systems with less than five (5) connections, Manning's Equation shall be acceptable for sizing the capacity of drain pipes for non-submerged conditions where the free water surface elevation is below the crown of the pipes. The Saint-Venant equations (full dynamic wave), which are used in many common engineering programs, shall be employed in larger design situations.
  - p. Storm drain profile plots will be included in the set of construction plans.
  - q. Storm drainage systems shall be designed to convey stormwater runoff by gravity flow unless otherwise approved.
  - r. For very flat flow lines, flow velocities shall increase progressively throughout the system. Upper reaches of the pipe system may have flatter slopes than the lower end of the system.
  - s. All drainage inlets shall be installed with a 12 inch sump for water quality benefits.
  - t. The maximum length of drainage pipe shall be based on the following criteria:
    - i. If both ends of a pipe are in or next to a road, driveway, or parking lot then the pipe length can be up to 400 feet.
    - ii. In situations where the access point of a pipe is some distance from a road, then the maximum pipe length shall be reduced from the 400 feet maximum by the distance from the road (400 feet – distance from the road).
    - iii. No pipe end or outfall can be more than 400 feet from a roadway, driveway or parking lot.
    - iv. All pipes must have at least one access point available for cleaning purposes and all access points must be above the 25-year hydraulic grade line.
2. Culverts:
- a. The minimum allowable size for any culvert shall be 15 inches.
  - b. All culverts shall be Reinforced Concrete Pipe (RCP) Class III as a minimum beneath traffic bearing areas such as roadways and driveways or inside a right-of-way. Double-walled, smooth interior, corrugated plastic pipe is acceptable in other areas if sufficient cover is provided.
  - c. Proper consideration of inlet and outlet control shall be given in the design of culverts and outlets;

- d. The pipe, appurtenant entrance and outlet structure shall properly account for water, bed-load, and floating debris at all stages of flow;
- e. There shall be no unnecessary or excessive cause of property damage;
- f. The outlet shall be designed to resist undermining and washout.
- g. Culvert design shall include all cross drainage facilities that transport stormwater runoff under roadways. Culvert selection techniques can range from solving empirical formulas, to using nomographs and charts, to comprehensive mathematical analysis for specific hydraulic conditions. The models approved for these calculations are listed below. Other widely accepted models may be used, but must be approved by the Stormwater Department
- h. Culverts under arterial roadways shall be designed using the fifty (50) year storm event, regardless of contributing area. Culverts under all other roadways must be designed to convey the twenty-five (25) year storm event or sized to match the upstream drainage system, whichever is greater. Ponding or backwater effects shall not impact any new or existing structures and recede after the storm event in a time period acceptable to the Stormwater Department.
- i. Additional hydraulic capacity shall be required as necessary to prevent backwater effects that may adversely impact upstream property or structures.
- j. Acceptable models for designing culverts include, but are not limited to:
  - ICPR by Streamline Technologies
  - HY-8 by the Federal Highway Administration (FHWA)
  - Culvertmaster by Haestad Methods, Inc.
  - Pond Pack by Bentley
  - HEC-RAS by the US Army Corps of Engineers
  - FlowMaster by Bentley
  - XPSWMM by XP Solutions

\*This list is not intended as a preference or to exclude others.
- k. A complete study of culverts and design considerations can be found in USDOT 2001a.

### 3. Headwalls and Outlets:

All exposed ends of pipes may be protected by one of the following type headwalls:

- a. A flared or beveled end section (limited to pipes 36" or less in diameter).
- b. A concrete or brick plastered with non-shrink grout, headwall is preferred; it is required on culverts located in major defined drainage channels.
- c. A rip-rap headwall is acceptable for pipes twenty-four (24) inches or less in a number of situations; if used. Note that this technique requires the use of nonwoven geotextile fabric.
- d. Outlets will not be allowed to discharge on fill slopes.



4. Energy Dissipation:
  - a. All outlets shall be sufficiently stabilized. Calculations will be provided justifying the design and material used (e.g. riprap aprons geometry and diameter),
  - b. If riprap aprons are used, filter fabric is to be installed beneath all riprap.
  - c. Level spreaders, plunge pools, etc. shall be properly designed and installed at the proposed outlet(s).
  
5. Catch basins, yard inlets, manholes, and junction boxes.
  - a. All designs shall include catchments to ensure that water will not cross a street or entrance way.
  - b. Catch basins shall be spaced so that the spread in the street for the 25-year design flow shall not exceed the following, as measured from the face of the curb:
    - i. 8 feet if the street is classified as a Collector or Arterial (for 2 lane streets spread may extend to one-half of the travel lane, for 4 lane streets spread may extend across one travel lane);
    - ii. 16 feet at any given section, but in no case greater than 10 feet on one side of the street, if the street is classified as a Local or Sub-Collector Street.
    - iii. For grated inlets located in residential areas, a clogging factor of 25% shall be used in the design of these systems.
    - iv. For grated inlets located in commercial areas, a clogging factor of 0% shall be used.
    - v. For curb opening or open throat inlets located in either residential or commercial areas, a clogging factor of 0% shall be used.
  - c. When the depth of a catch basin or junction box exceeds six (6) feet, rungs/steps shall be provided for ascent and descent. (Steps are to be ASTM-C-478, or equivalent.)
  - d. The box top shall be a minimum of three (3) feet by three (3) feet. Sides shall be plastered with grout.

Maximum roadway catch basin inlet capacity for an inlet shall be determined based on the following:

For inlets at sag, capacity shall be based on weir flow (unsubmerged). The depth flow shall be limited to the curb depth, but may be further limited by the allowed spread, detailed below. In sag conditions, a fifteen (15) percent factor of safety shall be used to account for debris/clogging. Ponding at the sag location shall be limited to twenty-four (24) hours after the storm event.

For inlet on grade, theoretical capacity shall consider in the design the longitudinal and cross slopes, and gutter depression. The length of the gutter opening must be such that the gutter efficiency is eighty (80) percent of the theoretical capacity. Several equations and nomographs are available in the literature for determining the theoretical capacity. Maximum flow depth shall be limited to the depth of curb.

- e. Inlets shall be designed to accommodate a given flow such that ponded water is removed within twenty-four (24) hours and does not cause flooding to adjacent buildings or other interests.
- f. Catch basins will be located outside curve radii. If this is not possible, the catch basin shall be set back an extra foot and the face of the catch basin shall be parallel to a chord joining the two (2) points on the curve radius located by projecting lines from the sides of the catch basin box.
- g. Drop boxes/manholes/junction boxes must have a minimum of a twelve inch (12") sump.
- h. Within a catch basin, the elevation at the crown of any inlet pipe shall be equal to or greater than the crown of the outlet pipe.
- i. Catch basins shall be field staked to ensure proper catch basin inlet alignment with the street gutter line.
- j. Inlet protection shall be provided at all inlets into the stormwater system during construction and until project closure procedures have been completed or notification from the Stormwater Department has been given stating that an acceptable level of stabilization has been achieved.
- k. Inlet spacing shall be based partly on the maximum spread of water into the road way. During the 25-year, 24-hour design storm, at least one full travel lane width (as per AASHTO standards) must be available during the rain event for all roads. Inlets up-gradient of a road intersection, sag inlets, or the last inlet for a given system must be designed with sufficient capacity to handle the entire flow, such that there is no flow through/bypass.
- l. In depth design procedures for inlet and storm sewer design may be referenced in AASHTO (1999), USDT (2001b), Mays, L., (2001), and Yen (2001). Culvert design guidance is found in USDT (2001a).
- m. All manhole lids and catch basins shall contain a stamp indicating that water entering these systems goes to local waterways.

## 6. Control Structures

The following criteria apply to the design of control structures:

- a. All designs shall include a defined outlet and have minimum size openings of four (4) inches.
- b. Shall not be placed within a right-of-way.
- c. If contained within a detention/retention pond, must be accessible for maintenance.
- d. Ease of maintenance and techniques to prevent clogging (i.e. 3-dimensional trash racks) shall be incorporated into the design.
- e. A riprap weir or earthen dam is not to be utilized as the only control structure.
- f. Control structures shall be designed to allow lowering of the pond by at least 12 inches below normal permanent pool elevation without the use of mechanical pumping.

## 3.6 Open Channel Hydraulics

Open channels shall include all permanent storm drainage channels including swales, culverts, and diversions. These storm drainage systems shall be designed based upon the following criteria:

1. Channels with bottom widths greater than 10 feet shall be designed with a minimum bottom cross slope of 12 to 1.
2. Channel side slopes shall be stable throughout the entire length and side slope shall depend on the channel material. A normal maximum for open channels should be 3:1 and a maximum of 3:1 on roadside ditches.
3. Trapezoidal or parabolic cross sections are preferred over triangular shapes.
4. For vegetative channels, design stability should be determined using low vegetative retardance conditions (Class D) and for design capacity higher vegetative retardance conditions (Class C) should be used. If permanent vegetation cannot be established immediately then an Erosion Control Blanket (ECB) or Turf Reinforcement Mat (TRM) shall be installed, and designed to handle the maximum velocities for the channel.
5. If relocation of a stream channel is unavoidable, the cross-sectional shape, meander, pattern, roughness, sediment transport, and slope should conform to the existing conditions as much as practicable. Some means of energy dissipation may be necessary when existing conditions cannot be duplicated.
6. Stream bank stabilization should be provided, when appropriate, as a result of any stream disturbance such as encroachment and should include both upstream and downstream banks as well as the local site.

7. Open channel drainage systems shall be sized to handle a 25-year design storm. The 100-year design storm shall be routed through the channel system to determine if the 100-year plus applicable building elevation restrictions are exceeded, structures are flooded, or flood damages increased. The open channel system should be designed so that the 100-year event does not overtop the banks. Calculations shall be provided in the stormwater report.
8. A cross section should be obtained at each location where there are significant changes in stream width, shape, or vegetal patterns. Sections should usually be no more than 4 to 5 channel widths apart or 100 feet apart for ditches or streams and 500 feet apart for flood plains, unless the channel is very regular.
9. All open channels are to be uniform and shall be stabilized to prevent erosion in a manner approved by the Stormwater Department. A number of acceptable techniques are shown in the current version of the SCDHEC BMP Handbook (2005).
10. The design of open channels shall be based on Manning's Formula where backwater effects from obstructions and/or tailwater is not present. Flow velocities for the ten (10) year storm event must be less than five (5) ft/sec (two and one-half (2.5) ft/sec in bare sandy soils) or the channel surfaces must be adequately lined, e.g., rip-rap, concrete.
  - a. The minimum channel grade shall be 0.005 ft/ft, unless supporting calculations show that there will be no pools or standing water areas formed in the channels at smaller slopes.
  - b. Design conditions may be assumed to be steady, uniform flow.
  - c. Channels may be designed with multiple stage levels with a low flow section to carry the two (2) year storm event and a high flow section to carry storms of larger frequencies.
  - d. Horry County allows vegetated channels. Guidance on the design of these type channels can be found in Haan et. al. (1995) or by using computer software that is capable of calculating channel stability and capacity.
  - e. Additional hydraulic capacity shall be required as necessary to prevent backwater effects that may adversely impact upstream property or structures.
  - f. General guidance on open channel design can be found in USDT (1996, 2001).
  - g. Acceptable models for designing open channels include, but are not limited to:

- ICPR by Streamline Technologies
- HY-8 by the Federal Highway Administration (FHWA)
- Pond Pack by Bentley
- HEC-RAS by the US Army Corps of Engineers
- Flow Master by Bentley
- XP SWMM by XP Solutions

\*This list is not intended as a preference or to exclude others.

### **3.7 Erosion Prevention and Sediment Control Standards**

Horry County requires that an erosion prevention and sediment control plan be submitted and approved prior to initiating land disturbance on construction activities that will disturb one-half (½) acre or more. This plan describes the practices and controls that will be used during and after construction to meet the following goals:

- a. Minimize the extent and duration of disturbed soil exposure,
- b. Stabilize disturbed areas promptly,
- c. Protect off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,
- d. Limit the exit velocities of the flow leaving the site to non-erosive or pre-development conditions, and
- e. Design and implement an ongoing inspection and maintenance plan.
- f. Drainage channels should be designed to avoid erosion problems. Wide channels with flat slopes lined with grass or other vegetation should be used where practical. Where channel gradients are steep, concrete linings or grade control structures such as check dams may be required. Every effort should be made to preserve natural channels.
- g. Sediment basins may be constructed to trap sediment. The basins should be constructed with a positive outfall to discharge stormwater runoff while retaining sediment loads. Sediment basins may be temporary or permanent as required by the County Stormwater Department.
- h. Detention basins may also be used to trap sediment during and after development. Where used for this purpose, the basin shall continue to detain stormwater in accordance with the hydraulic design criteria, but allow for the settlement and retention of sediment in the basin calculations shall be provided whenever detention basins are used to trap sediment. Added storage volume for stormwater shall be required to account for the volume lost to sedimentation. Sediment must be removed periodically to insure the intended performance of the basin.

- i. Good stands of existing vegetation adequate to control erosion shall be preserved whenever possible. Regeneration of native vegetation should be encouraged wherever possible.

### 3.7.1 Accepted Erosion Prevention and Sediment Control BMPs

The types of erosion prevention and sediment control BMPs that are acceptable for use in Horry County are presented below. These fall into three categories: erosion prevention measures, temporary sediment controls, and runoff control and conveyance measures. Runoff from sites shall contain controls that fall into at least one of these categories. The SCDHEC BMP Handbook (2005) can be referenced for additional details on acceptable BMPs.

#### 3.7.1.1 Erosion Prevention Measures

Erosion prevention measures shall be used during and after construction site preparation to avert the discharge of runoff highly concentrated with sediment and other associated pollutants. One or more measures are typically needed on a given site. Measures that fall into this category along with their preferred application are provided in Table 3.12. Details on each of these measures are not discussed in this Manual. Guidance documents that will be referenced as necessary include: SCDHEC (2003), Haan, C. T., Barfield, B. J., and Hayes, J. C. (1995) and Shwab, Glenn O. and Richard K. Frevert (1985). Other practices, such as engineered devices, will be allowed as long as sufficient evidence is presented as to their effectiveness.

**Table 3.12: Erosion Prevention BMP Suggested Uses**

BMP	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Surface Roughening	X		X				
Bench Terracing	X		X				
Temporary Seeding	X		X		X	X	X
Mulching	X				X	X	
Erosion Control Blankets (ECB) and Turf Reinforcement Mats (TRM)	X	X	X			X	
Final Stabilization	X		X		X		X
Topsoiling			X		X		
Permanent Seeding and Planting of Grasses	X		X		X		X
Permanent Ground Cover Plants	X		X				X
Sodding	X		X		X		X
Riprap or Aggregate	X	X	X				
Outlet Protection		X		X			X
Dust Control					X	X	X
Polyacrylamide (PAMs)	X		X	X	X	X	X

### 3.7.1.2 Temporary Sediment Control Measures

Horry County emphasizes preventative measures as the main control to protect against erosion, both during and following construction. However, there are typically instances where erosion prevention measures alone do not provide sufficient control. For these situations, temporary sediment controls shall be implemented to control the migration of eroded sediment off site. The sediment control measures are typically only applicable as practices for use during construction. One or more of the measures may be utilized as appropriate during the project's construction phase. Table 3.13 contains a list of some of the suggested controls of this type along with their intended use. Details on these and others measures are again not discussed in detail in the

Manual; however, an excellent reference is Haan, Barfield, and Hayes (1995). Other practices, such as engineered devices, will be allowed as long as sufficient evidence is presented as to their effectiveness.

**Table 3.13: Temporary Sediment Control BMP Suggested Uses**

BMP	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Storage Volumes and Maintenance Schedules		X		X			X
Temporary Sediment Basin		X	X	X			X
Multipurpose Basin		X	X	X			X
Temporary Sediment Trap		X	X				X
Silt Fence	X	X					X
Rock Ditch Check			X				X
Stabilized Construction Entrance					X		X
Storm Drain Inlet Protection		X		X			X
Vegetated Filter Strips		X					X
Rock Sediment Dike		X	X				X

### 3.7.1.3 Runoff Control and Conveyance Measures

This category of erosion prevention and sediment control BMPs may be used as necessary during and following construction. Suggested varieties and their corresponding uses are provided in Table 3.14.

**Table 3.14: Runoff Control and Conveyance Measures BMP Suggested Uses**

BMP	Slope Protection	Waterway Protection	Surface Protection	Enclosed Drainage	Large Flat Areas	Borrow Areas	Adjacent Properties
Pipe Slope Drains	X		X				
Temporary Stream Crossing		X	X				X
Runoff Conveyance Measures	X					X	X
Construction De-watering		X		X	X	X	
Level Spreader			X		X		X

### 3.7.1.4 Temporary Vegetation/Seeding

#### Description

The purpose of temporary seeding is to reduce erosion and sedimentation by stabilizing disturbed areas that would otherwise lay bare for long periods of time before they are worked or stabilized. Temporary seeding is also used where permanent vegetation growth is not necessary or appropriate. In addition to the methods and schedules presented in this section, the SCDOT Technical Specification for Seeding (SC-M-810-2(04/11)) should be utilized for guidance in temporary vegetation/seeding practices. The SCDOT seeding specification can be found at <http://www.scdot.org/doing/technicalpdfs/suptechspects/sc-m-810-2.pdf>

#### When and Where to Use It

Temporary seeding is used on exposed soil surfaces such as denuded areas, soil stockpiles, dikes, dams, banks of sediment basins, banks of sediment traps, and temporary road banks. Temporary seeding prevents and limits costly maintenance operations on other sediment control structures. Sediment cleanout requirements for sediment basins, sediment traps and silt fence is reduced if the drainage area is seeded when grading and construction operations are not taking place. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased. Temporary stabilization may be accomplished by the application of mulch.

### 3.7.1.5 Permanent Vegetation/Seeding

#### Description

Prior to the County conducting a final site inspection and closing out a construction project, the site must meet final stabilization requirements. Final stabilization means that all land-disturbing activities at the construction site have been completed and that on all areas not covered by permanent structures, either (1) a uniform (e.g., evenly distributed, without large bare areas) vegetative cover with a density of seventy (70) percent has been established, or (2) equivalent



permanent stabilization measures (such as the use of landscaping mulch, riprap, pavement, and gravel) have been implemented to provide effective cover for exposed portions of the construction site not stabilized with vegetation. In addition to the methods and schedules presented in this section, the SCDOT Technical Specification for Seeding (SC-M-810-2(04/11)) should be utilized for guidance in permanent vegetation/seeding practices. The SCDOT seedingspecification can be found at <http://www.scdot.org/doing/technicalpdfs/suptechspecs/sc-m-810-2.pdf>

## When and Where to Use It

Permanent seeding is used on exposed soil surfaces such as denuded areas, soil stockpiles, dikes, dams, banks of sediment basins, banks of sediment traps, and road banks. Seeding prevents and limits costly maintenance operations on other sediment control structures. Sediment cleanout requirements for sediment basins, sediment traps and silt fence is reduced if the drainage area is seeded when grading and construction operation are not taking place. Permanent stabilization is required within fourteen (14) days after construction activity is complete.

### 3.7.2 Design Standards

#### 3.7.2.1 General Standards

1. Erosion Prevention and Sediment Control (EPSC) plans shall be developed to achieve an eighty (80) percent design removal efficiency goal. Simply applied, when a site is completely denuded of vegetation, the structural and nonstructural EPSC measures are designed to trap 80 percent of the total suspended solids (TSS) that are generated by the site. The design storm event associated with this level of control is the ten (10) year twenty-four (24) hour SCS Type III storm event. Calculations using models, such as SEDPRO or SEDCAD, or SCDHEC design aids shall be provided to show adherence to this criteria. The mention of these design aids is not intended as preference or to exclude others.
2. SCS procedures shall be used to determine runoff amounts. It is important to note that when a BMP is designed for the ten (10) year twenty-four (24) hour storm event, the BMP will have a greater trapping efficiency for more frequent events such as the two (2) year twenty-four (24) hour storm event.
3. A sediment detention basin is required when ten (10) or more acres of disturbed land area drains to a single outlet point. Such basins shall be designed to have an eighty (80) percent trapping efficiency for TSS for the ten (10) year twenty-four (24) hour storm event to pre-development conditions, and successfully pass the one hundred (100) year twenty-four (24) hour storm event. Sediment basins shall be limited to controlling runoff for twenty (20) acres. Sediment traps shall not have more than five (5) acres draining to them. Activities that disturb between one (1) and ten (10) acres of land area that do not drain to a single outlet point may incorporate practices other than a sediment basin to achieve equivalent removal efficiency.

4. Silt fencing shall be placed on a flat area adjacent to the toe of all fill slopes and soil berms and below disturbed areas where the size of the area is no more than ¼-acre per one hundred (100) feet of silt fence length. The maximum slope length behind the fence is one hundred (100) feet and the maximum gradient behind the fence is 2H:1V.
5. The following nonstructural site management practices shall be utilized on the plans where applicable:
  - a. Minimize site disturbance to preserve and maintain existing vegetative cover,
  - b. Limit the number of temporary access points to the site for land disturbing activities,
  - c. Protect off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,
  - d. Phase and sequence construction activities to minimize the extent and duration of disturbed soil exposure, and
  - e. Implement an ongoing inspection and maintenance plan. Suggested maintenance schedules are given in the SCDHEC BMP Handbook (2005).
6. Sediment storage volumes shall be calculated for all sediment controls to determine the required clean-out frequencies and maintenance schedules. The Universal Soil Loss Equation (USLE) and subsequent modifications or other acceptable methods that determine sediment yield may be used to predict the required sediment storage volumes for specific sediment control structures
7. To encourage the development and testing of innovative alternative EPSC BMPs, alternative management practices that are not included in the Manual may be allowed upon review and approval by the Stormwater Department. To use an alternative BMP, the design professional shall submit substantial evidence that the proposed measure will perform at least equivalent to currently approved BMPs contained in the Manual. Evidence may include, but is not limited to:
  - a. Supporting hydraulic and trapping efficiency calculations.
  - b. Research results as reported in professional journals.
  - c. Manufacturer's literature.
8. Detailed EPSC plans shall comply to the maximum extent practicable with the following specific standards and review criteria:
  - a. Sediment tracking control shall be implemented using stabilized construction entrances that are to be located and utilized at all points of ingress/egress on a construction site. The transfer of soil, mud, and dust onto roads shall be prevented.

- b. If surface roughening is to be performed along a sloped area, the tracks should always be perpendicular to the slope/flow path to interrupt runoff.
- c. Crossings of waterways during construction will be minimized and must be approved by the Stormwater Department and possibly the USACE. Encroachment into stream buffers, riparian areas and wetlands will be avoided when possible.
- d. Topsoil shall be stockpiled and preserved from erosion or dispersal both during and after site grading operations when applicable.
- e. Where construction or land disturbance activity will or has temporarily ceased on any portion of a site, temporary site stabilization measures shall be required as soon as practicable, but no later than fourteen (14) calendar days after the activity has ceased. Hydroseeding as often as possible is encouraged. Stabilization of disturbed areas is one of the best approaches for erosion prevention and sediment control.
- f. All slopes must be stabilized though grassing, hydroseeding, synthetic or vegetative matting, diversion berms, temporary slope drains, etc.
- g. Final stabilization of the site shall be required within fourteen (14) calendar days of construction completion. Final stabilization is defined as having seventy (70) percent or more of the entire site with permanent coverage in good condition.
- h. Temporary structural controls installed during construction shall be designed to accomplish maximum stabilization and control of erosion and sedimentation, and shall be installed, maintained, and removed according to the specifications set forth in the Manual and project specifics developed as part of the permit application. All temporary structural controls shall be designed to control the peak runoff resulting from the twenty five (25) year storm event.
- i. All permanent structural controls, including drainage facilities such as channels, storm sewer inlets, and detention basins, shall be cleaned out as part of the project closeout process. Upon final stabilization, all temporary sediment/erosion controls (i.e. silt fencing) shall be removed prior to project closeout.
- j. Linear projects (utility lines, road construction) over, under, or along water body shall include measures and controls which adequately protect the water body from undue impact. Such work shall not be performed without approval from USACE. In addition, such work shall be coordinated with the installation of erosion prevention and sediment control measures so that disruption is minimized. Every effort should be made to install utilities during the initial construction phases. Trench sharing is encouraged to the extent practicable

9. The grading plan shall include the following general measures at a minimum:
  - a. The finished cut and fill slopes, including berms, to be vegetated shall not be steeper than 3H:1V.
  - b. Cuts or fills may not be so close to property lines as to endanger adjoining property without adequately protecting such properties against erosion, sedimentation, slippage, settlement, subsidence, or other damages.
  - c. Subsurface drainage may be provided in areas having a high water table to intercept seepage that would affect slope stability, bearing strength or create undesirable wetness.
  - d. No fill shall be placed where it can slide or wash onto another property.
  - e. Fill shall not be placed adjacent to channel banks where it can create bank failure, reduce the capacity of the stream, or result in downstream sediment deposition.
  - f. All borrow and disposal areas shall be included as part of the grading plan.
  - g. Adequate channels and floodways shall be provided to safely convey increased runoff from the developed area to an adequate outlet without causing significant channel degradation, or increased off-site flooding.
  - h. The site shall be graded to direct flows to appropriate controls.
10. EPSC plan shall have the following information contained within a cohesive, organized, and easy to follow format:
  - a. Location, scope, and manner of performing sediment and erosion control measures.
  - b. Proposed construction sequence and time schedule for all earth disturbing activities and installation of provisions for sediment and erosion control. The sequence and phasing shall take into account exposing the smallest practical areas for the shortest period of time and retain as much natural vegetation as possible to prevent erosion.
  - c. Design computations and applicable assumptions for all structural measures for sediment and erosion control. Volume and velocity must be given for all surface water conveyance measures and piped outfalls.
  - d. All components of a Stormwater Pollution Prevention plan as outlined by SCDHEC and the most current Construction General Permit (CGP).
  - e. Sediment control practices shall be used around the perimeter of the site to prevent off-site sediment damage.
  - f. Methods to be used for controlling dust during construction.

- g. Delineation of all sensitive features (wetlands, streams, ponds, existing stormwater structures, etc.) and potential sediment sources;
- h. Installation sequencing and maintenance schedules for all EPSC BMPs during and after construction;
- i. Provisions to preserve topsoil and limit the amount of total disturbed area;
- j. Details of site grading;
- k. Protection of all storm drain inlets and outlets;
- l. For sites which disturb greater than five (5) acres, a list or calculation of the trapping efficiency for all EPSC BMPs, as applicable;
- m. For sites which disturb greater than five (5) acres, calculations of required sediment storage volumes for all EPSC BMPs, as applicable;
- n. Explanation of any computer models or software used with highlights of and/or notes on the output data;
- o. Locate temporary and permanent soil disposal areas, haul roads, and construction staging areas to minimize erosion, sediment transport, and disturbance to existing vegetation.
- p. All necessary certifications by the person responsible for the activity. This includes the NOI application signatures and maintenance covenants. Proper preparation of the EPSC Plan and the SWPPP, if necessary, by a registered engineer, landscape architect, Tier B land surveyor, or a qualified Federal Government employee.

### **3.7.2.2 Typical Design Procedures**

The design procedures will vary depending on the EPSC BMP. Many of the BMPs listed previously in this chapter do not need to be “designed” using calculations, such as surface roughening or dust control. Others require the use of equations or design aids to properly design. SCDHEC has two handbooks, the BMP Handbook (SCDHEC 2005) and the Stormwater Management and Sediment Control Handbook (SCDHEC 2003) that provide the procedures and equations needed to design EPSC BMPs. Example problems are given for most types. As with the design of any BMP, engineering judgment will be needed on most applications. Proper design must be complemented with proper installation and routine maintenance in order for BMPs to be effective and to adhere to these provisions of this section.

## 3.8 Easement Ownership

The following section provides the required easement widths for various components of the stormwater system. This section applies to easements that are publicly and privately dedicated and accepted by Horry County. All easements are to be calculated the same whether they are private or public. There will be an allowance for offset easements, in which the pipe, channel, or other stormwater system component does not have to be in the middle of the easement width, but may be offset to allow for certain construction needs. Proposed offset easements will be identified on the plans and additional width may be required as prescribed by the Stormwater Department.

### 3.8.1 Storm Drain Pipe

Drainage easements shall provide adequate room for maintenance equipment to operate. The width of piped drainage easements shall be determined using the following equation:

$$\text{Easement Width} = [\text{Pipe Depth (in feet)} \times 3] + [\text{Pipe Diameter (in feet)}]$$

The Pipe Depth shall be as measured from the bottom of the pipe to finished grade. The calculated piped drainage easement shall always be rounded up to the next higher 5-foot increment. Also, the minimum width for any piped drainage easement shall be twenty (20) ft.

For multiple pipes, box culverts or multiple box culverts, the easement width shall be the outside diameter or width of the system plus 3 times the depth of the system measured from the invert of the pipe, but the minimum total shall not be less than thirty (30) feet.

### 3.8.2 Swales and Ditches

For open channel easements, the following widths shall apply:

When the top width of the channel is equal to or less than fifteen (15) feet, the following equation shall be used:

$$\text{Easement Width} = (\text{25-foot offset on one side}) + (\text{Channel Top Width}) + (\text{5-foot offset on the other side})$$

When the top width of the channel exceeds fifteen (15) feet, the following equation shall be used:

$$\text{Easement Width} = (\text{25-foot offset on one side}) + (\text{Channel Top Width}) + (\text{25-foot offset on the other side})$$

For minor swales along lot lines where the side slopes are equal to or flatter than 5:1 and the depth does not exceed twenty four (24) inches, a drainage easement not less than twenty (20) feet in width shall be provided.

The maximum slope for ditch maintenance easement ways (from top of bank to edge of easement) will be at a maximum slope of 10:1.

Common areas may be used for access to drainage easements to provide maintenance.

### **3.8.3 Detention Ponds**

For detention basins and other stormwater management facilities, a maintenance easement shall be provided around the facility and shall be a minimum of twelve (12) feet from the normal water level (NWL) elevation.

Stormwater ponds must be located in common space up to the top of bank for major residential subdivisions. Top of bank is defined as the water surface elevation of the 100-yr storm.

### **3.8.4 Other Stormwater Facilities & BMPs**

All other structures used for the control of stormwater runoff (quantity or quality) not otherwise covered above, shall have an easement for access and maintenance that is a minimum of twenty (20) feet beyond the boundary of any such structure. The Stormwater Department may request or allow other easement widths on a case-by-case basis given site constraints or special conditions.

### **3.8.5 Offsite Easements**

Any required off-site easements shall be obtained prior to site construction permit issuance which would impact upon that area. Any work done without a proper and adequate easement(s) shall be at the owner's own risk. Non-subdivision projects shall provide validation of necessary easements before a site construction permit will be issued.

## **3.9 Special Protection Areas**

In an effort to address some of the most critical water resource problems that exist in the County, Special Protection Areas may be established. These areas may be established through written direction by the Stormwater Department or by the establishment of specific local, state or federal requirements (TMDL, 303d Impaired Waterbodies List, etc.). Those wishing to develop or redevelop lands within these protected areas will be required to comply with the minimum standards listed in the preceding sections as well as a set of design criteria detailed below.

Design criteria within Special Protection Areas may impose water quantity (reduces or prevents frequent and/or extreme flooding) or a water quality criteria that prevents or reduces degradation of riverine, estuarine, coastal ecosystems or maintains a designated use(s). Water quality impairments may be identified through the County's Stormwater Management Program and/or any other local, state or federal requirements. The Stormwater Department will inform permit applicant(s) when submitted applications and/or proposed projects are located within a Special Protection Area. This does not relieve the applicant(s) of other local, state or federal requirements (State approved TMDL's, etc.) Due to the dynamic nature of these Special Protection Areas, the applicant will meet with the Stormwater Department to discuss specific design criteria.

### **3.9.1 Water Quantity**

Flooding problem areas exist in many locations around the County to the point that stormwater controls have become overwhelmed where controls were never adequately designed or installed to control runoff. The ability to maintain a system is also suspected to contribute to some of the frequent flooding. In an effort to relieve existing flooding problems, Horry County may require additional design criteria during the construction site permitting process.

### **3.9.2 Water Quality**

In conjunction with the NPDES permitting program, SCDHEC, through delegated responsibility from EPA, must identify and mitigate impaired waterbodies. Impaired waterbodies are identified through a monitoring program, the results of which are compared against water quality standards developed to protect designated uses of individual waterbodies. These impaired waterbodies are those that do not meet these standards and cannot be used for their designated purposes, such as fishing, swimming, recreation, and/or support of aquatic life. In accordance with Section 303 of the Clean Water Act, states must release a bi-annual report of the impaired waterbodies. Waters listed on the 303(d) list will have a TMDL developed, which represents the daily amount of a particular pollutant that a waterbody can receive and still meet the water quality standard for its designated use(s).

### **3.9.3 Shoreline Protection**

Shorelines are environmentally sensitive areas that can impact water quality of adjacent waterbodies. The design and installation of stormwater systems and facilities at or near the shoreline shall follow the list of criteria below as applicable.

1. The natural dune system and native vegetation shall not be impacted unless an appropriate permit has been issued by SCDHEC-OCRM and/or the appropriate local government.
2. No beachfront outfalls are allowed unless an appropriate permit has been issued by SCDHEC-OCRM and/or the appropriate local government.
3. Installation of sediment/erosion control BMPs should take into consideration migration of sediment due to wind.
4. All SCDHEC-OCRM and local government beachfront setback policies must be followed.



## **Chapter 4 Inspections & Enforcement**

This chapter establishes inspection and enforcement guidelines to be followed by the County and the permittee.

### **4.1 Stormwater Construction Site Inspections**

The County will inspect applicable construction sites from initial land clearing to final stabilization. The purpose of these inspections will be to check for compliance with and ensure enforcement of the County stormwater management plan approved by the Stormwater Department. These construction site inspections will need to address terms and conditions of the County's stormwater ordinance, this manual and SCDHEC's Construction General Permit (CGP).

Construction site inspections shall ensure that the approved County permit or stormwater management plan, the SWPPP, and the construction plans are on the project site and are properly being followed and implemented. Any modifications to the SWPPP must be documented on the on-site SWPPP. County inspections are not to be construed as a relaxation of the requirements on owners/operators to conduct self-inspection in accordance with any applicable local, state or federal stormwater requirements

### **4.2 Stormwater Post-Construction Site Inspections**

Post-Construction maintenance inspections must also be performed on stormwater management systems and facilities throughout their useful life. For each system or facility installed or retrofitted during an approved land disturbance project, the applicant must have submitted a signed maintenance covenant (see Appendix D) and a completed maintenance plan template (see Appendix E). Parties performing post-construction inspections for the permittee must document that permanent maintenance is being performed in accordance with the maintenance schedules for the various stormwater management facilities in the County permit or approved stormwater management plan. County inspectors will be checking for adherence to this maintenance plan and any necessary changes that may arise after installation.

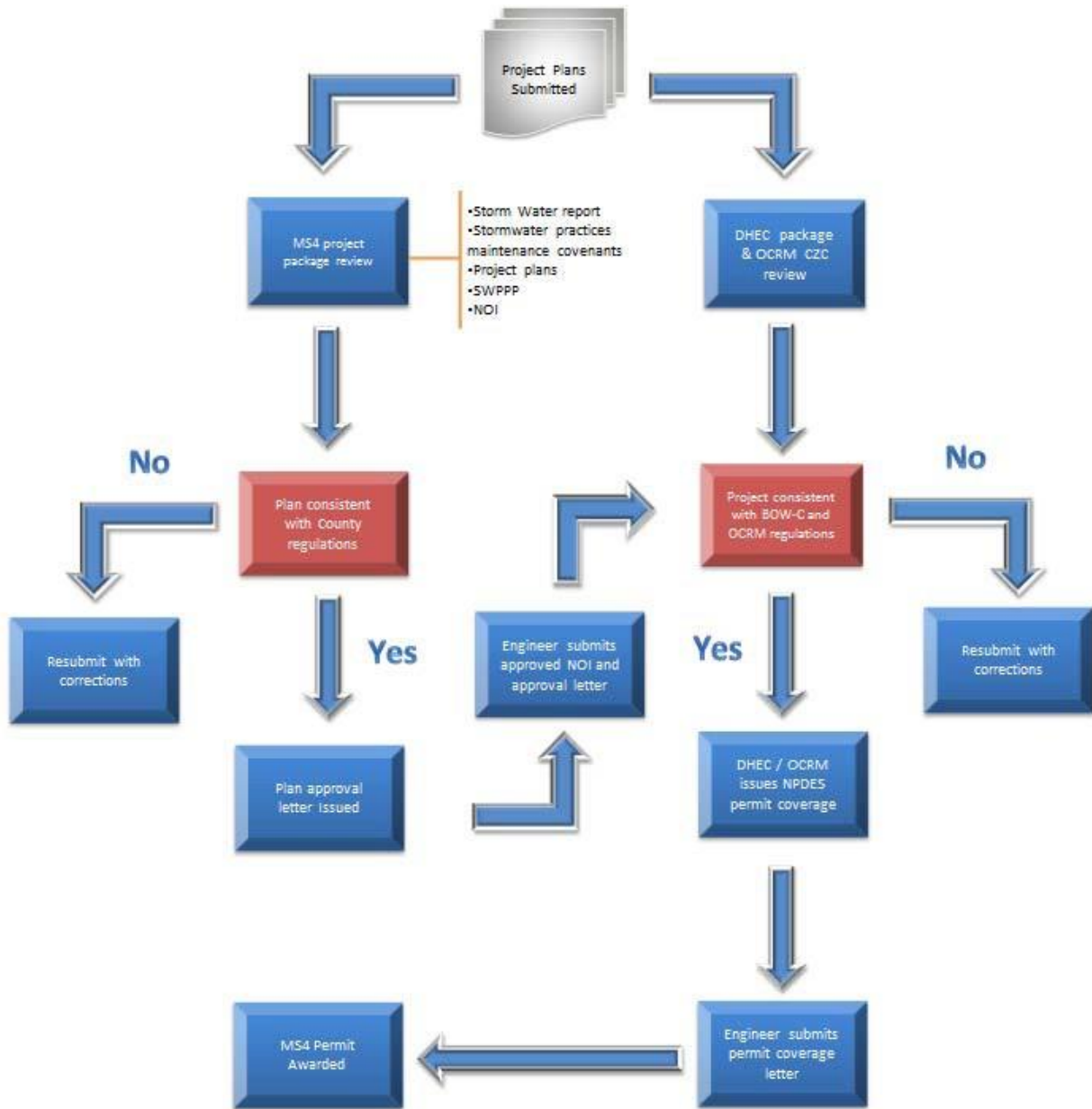
### **4.3 Enforcement**

If the County determines that a project is in non-compliance with the County Stormwater Management Ordinance or this Manual then the Stormwater Department may ensure conformity by proceeding with the appropriate enforcement action. The types of enforcement tools available to the County are outlined in the Enforcement Response Plan (ERP) found in Appendix F and include Verbal Warnings, Written Warnings (Notice of Violation and Stop Work Order), Denial of Certificate of Occupancy (for construction projects) and Citations (Civil/Criminal Penalties).

Violations can be categorized as either minor or major. The severity of the violation can be based on the duration of the violation, the effect the violation caused on the environment, and whether or not the violator is a repeat offender. These key factors can be used in determining the severity of the violation but the classification is not limited to these only. Minor violations typically have not caused an immediate threat to the environment or SMS4 and most often only require a verbal or written warning. Major violations are assessed when the operator has failed to comply with the stormwater ordinance or has not complied with violation notices, and such negligence has caused an immediate or significant impact on the environment or SMS4. The County may determine the severity of a violation at its discretion.

# **Appendix A**

## **Permitting Flow Chart**



**Appendix B**  
**Permit Transfer Form**



**Appendix C**  
**Notice of Intent (NOI) Form**



**NOTICE OF INTENT (NOI)**  
**For Coverage(s) of Primary Permittees**  
**Under South Carolina NPDES General Permit**  
**For Stormwater Discharges From Construction Activities SCR100000**  
 (Maintain As Part of On-Site SWPPP)

**For Official Use Only**

File Number: \_\_\_\_\_  
 Permit Number: SCR10 \_\_\_\_\_  
 Submittal Package Complete: \_\_\_\_\_

*Submission of this Notice of Intent constitutes notice that the Applicant identified in Section II intends to be authorized as a Primary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. Fees required for review and NPDES coverage of each application type are as listed on page 2 of the Instructions.*

Date: \_\_\_\_\_  
 Project/Site Name: \_\_\_\_\_ County: \_\_\_\_\_  
 (Modification or Change of Information Only) Prior Approved NPDES Permit or File Number: \_\_\_\_\_

Do you want this project to be considered for the Expedited Review Program (ERP)?  Yes or  No (See instructions)

**I. Notice of Intent (NOI) Application Type(s)**

- A. **Project (Application/Review) Type(s)** (Select ALL that apply):  
 New Project (Initial Notification) Ongoing Project:  Permitted or  Un-Permitted  
 Late Notification  Low Impact Development (LID) or Project Design Above Regulatory Requirements  
 New Owner/Operator or Company Name Change (see instructions, attach Form A (Transfer of Ownership))  
 Major Modification: (see instructions, attach Form B (Major Modifications))  
 MS4 Project Review  
 Ocean and Coastal Resource Management (OCRM) Review  
 Change of Information/Other (Specify): \_\_\_\_\_
- B. If Applicable, identify the entity designated as **MS4 Reviewer and MS4 Operator** (i.e., Lexington County, City of Greer, etc.): **MS4 Reviewer** \_\_\_\_\_ **MS4 Operator** \_\_\_\_\_

**II. Primary Permittee Information**

Person or  Company If a Company, are you a  Lending Institution or  Government Entity?  
 Company EIN (if applicable): EIN: \_\_\_\_\_

- A. **Primary Permittee** **Name:** \_\_\_\_\_  
 \_\_\_\_\_ Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_  
 State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email Address: \_\_\_\_\_
- B. **Contact /ODSA Name** (if different from above OR if owner is a company): \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email Address: \_\_\_\_\_
- C. **Property Owner Name** (if different from above): \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email Address: \_\_\_\_\_

**III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information**

Change of Information

- A. **C-SWPPP Preparer Name:** \_\_\_\_\_
- B. **Registered Professional** Engineer  Landscape Architect  Tier B Land Surveyor  **S. C. Registration #:** \_\_\_\_\_
- C. **Company/Firm Name:** \_\_\_\_\_ **S. C. COA # :** \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email Address: \_\_\_\_\_

**IV. Project/Site Information**

Change of Information

- A. **Type of Construction Activity(ies)** (Select ALL that apply):  
 Commercial  Industrial  Institutional  Mass Grading  Linear  Utility/Infrastructure  
 Residential: Single-family  Residential: Multi-family  Multi-use (Commercial & Residential)  
 Site Preparation (No New Impervious Area)  Other (Specify) \_\_\_\_\_
- B. **Site Address/Location** (street address, nearest intersection, etc.) \_\_\_\_\_  
 City/Town (if in limits): \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Latitude: \_\_\_\_\_° \_\_\_\_\_' \_\_\_\_\_" N Longitude: - \_\_\_\_\_° \_\_\_\_\_' \_\_\_\_\_" W (Source):  GPS  Web Site: \_\_\_\_\_  
**Tax Map Number (s)** (List all): \_\_\_\_\_



- C. Is this site located on **Indian Land**?  Yes  No
- D. **Proposed Start Date:** \_\_\_\_\_ **Proposed Completion Date:** \_\_\_\_\_
- E. **Disturbed Area** (nearest tenth of an acre): \_\_\_\_\_ **Total Area** (acres): \_\_\_\_\_
- F. **Modification Only:**(nearest tenth of an acre): **Disturbed Area: Current (Approved) Area:** \_\_\_\_\_  
**Disturbed Area Change (Increase Only):** \_\_\_\_\_ **Total Disturbed Area (After Change):** \_\_\_\_\_
- G. Is this project part of a **Larger Common Plan for Development or Sale (LCP)**? Yes No  
**LCP/ Overall Development Name:** \_\_\_\_\_  Check here if this is the **First Phase.**
- Previous State Permit/File Number:** \_\_\_\_\_ **Previous NPDES Coverage Number:** SCR10

- H. Any **Flooding Problems** exist downstream of or adjacent to this site? Yes No (If yes, provide detailed description of flooding problems and applicable floodway/flood zone information in the C-SWPPP).
- I. Active **S.C. DHEC Warning Notice, Notice to Comply or Notice of Violation** for this site or LCP? Yes No
- J. List Relevant **State and Federal Environmental Permits or Approvals** applied for or obtained for this site (e.g., **RCRA, USACOE, Nationwide**, etc.). If None, list None.
- K. **Any Waiver(s)/Variances/Exceptions Requested for this Project?** (If yes, identify below and include **Waiver Request and Justifications** in the C-SWPPP for each proposed request).

1. Small Construction Activity Waiver(s) From NPDES permitting (Section 1.4 & Appendix B)? If yes, Identify requested waiver: <input type="checkbox"/> Rainfall Erosivity Waiver <input type="checkbox"/> TMDL Waiver <input type="checkbox"/> Equivalent Analysis Waiver	Yes	No
2. Detention Waiver (72-302(B))?	Yes	No
3. Other (Specify): _____		

**V. Waterbody Information** (Attach additional sheet(s) as needed)  **Change of Information**

A. **Receiving Waterbody(s) (RWB) Information** (List the nearest and next nearest receiving waterbodies to which the sites stormwater discharges will drain. If stormwater discharges drain to multiple waterbodies, list all such waterbodies).

1. Name of Receiving Waterbodies (RWB)	2. Distance to RWB (feet)	3. Classification of RWB
a. Nearest: _____		
b. Next Nearest: _____		
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): _____		Not Applicable
d. Other Waterbodies: _____		

B. **Waters of the U.S. / State Information** (Attach additional sheet(s) as needed)

Waters of the U.S./ State	1. On the site?	2. Delineated/ Identified?	3. Impacts?	4. Amount of impacts
a. Jurisdictional wetlands	Yes No	Yes No	Yes No	___Ac
b. Non-jurisdictional wetlands	Yes No	Yes No	Yes No	___Ac
c. Other Water(s): _____	Yes No	Yes No	Yes No	___Ac ___Feet
d. Coastal Zone ONLY: Direct Critical Area	Yes No	Yes No	Yes No	___Ac ___Feet

5. If yes for impacts in B.3, describe each impact and activity, and list all permits (e.g., USACOE Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact:

C. **S.C. Navigable Waters (SCNW) Information (Section 2.6.5)** The Department will address any issues related to State Navigable Waters' Program under SC Regulation 19-450 during the review of the C-SWPPP for activities that will **NOT** require a 404 permit or a 401 certification. (Attach additional sheet(s) as needed).

1. Are S. C. Navigable Waters (SCNW) on the site? Yes No		
a. If no, do not complete this question. Proceed to Section D (Impaired Waterbodies).		
b. If yes, provide the name of S.C. Navigable Waters (SCNW) on the site: _____		
2. If yes for C.1, will construction activities cross over or occur in, under, or thru the SCNW? Yes No		
If yes, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.) and proceed to Section C.3: _____		
3. Identify permits providing coverage of SCNW activities proposed for your site. If NONE, list none.		
Permits/Certifications	Permit or Certification No.	Corresponding Covered SCNW Activity(ies)
a. DHEC General/ Other DHEC Permit		
b. USACOE 404 Permit or 401 Certification		
c. SCNW Permit		All Activities or Some Activities (Describe):
If applied for or issued, identify Date applied for or issued: _____		

**d. If a SCNW Permit has NOT been applied for** provide an additional plan sheet that shows plan and profile views (drawn to scale) of the SCNW and associated activities. Include a description of all proposed activities on this plan.

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**D. Impaired Waterbodies Information** (Attach additional sheet(s) as needed)

1. 303(d) Listed Impaired Waterbodies					
a. Name of <b>Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)</b> that receives stormwater from your construction site and/or thru an MS4 and the <b>Name of the Corresponding Waterbody?</b>		b. Is this WQMS(s) listed on the <b>most current 303(d) List? If No, proceed to Section 2 of this table. If Yes, complete items c thru f.</b>	c. List the pollutant(s) identified as <b>"CAUSES"</b> of the impairment	d. Will any pollutants causing the impairment be present in your site's construction stormwater discharges?	e. If <b>yes for d</b> , list the <b>"USE SUPPORT"</b> impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s)	Corresponding Waterbody				
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	

f. If **yes for d** above, will use of the BMPs proposed for your project ensure the site's discharges will **NOT** contribute to or cause further WQS violations for the impairment(s) listed in c?  Yes  No  
**(NOTE: If no for f, this site is NOT eligible for coverage under the CGP).** See Instructions.

2. TMDL Impaired Waterbodies				
a. Name of <b>Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)</b> that receives stormwater from your construction site and/or thru an MS4?	b. Has a TMDL(s) been developed for this WQMS(s)? <b>If No, identify as such below and proceed to Section VI. If Yes, complete items c thru f of this table.</b>	c. If <b>yes for b</b> , what pollutants are listed as <b>"CAUSES"</b> or causing the impairment?	d. If <b>yes for b</b> , has the standard been <b>"ATTAINED"</b> or <b>"Fully Supported"</b> for the impairment(s)?	e. If <b>no for d (Not Attained)</b> , will any pollutants causing the impairment be present in your site's construction stormwater discharges?
	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

f. If **yes for e** above, are your discharges consistent with the assumptions and requirements of the TMDL(s)?  Yes  No  
**(NOTE: If no for f, this site is NOT eligible for coverage under the CGP).** See Instructions.

**VI. Signatures and Certifications** **DO NOT SIGN IN BLACK INK!** Read the Certifications below (in entirety). Provide date, printed name, and signatures below. If you are a **New Owner/Operator**, as Primary Permittee you must also sign and date the applicable Comprehensive SWPPP Acceptance & Compliance Agreement below.

**C-SWPPP PREPARER:** "One copy of the C-SWPPP, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, pursuant to Regulation 72-300 et seq. (if applicable), and in accordance with the terms and conditions of SCR100000." **(This should be the person identified in Section III).**

_____ <b>Printed Name of C-SWPPP Preparer</b>	_____ <b>Signature of C-SWPPP Preparer</b>	_____ <b>S. C. Registration #</b>
--	---	--------------------------------------

**PRIMARY PERMITTEE:** "I or I (on behalf of my company and its contractors and agents), as the case may be, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that DHEC enforcement actions may be taken if the terms and conditions of the C-SWPPP are not met and I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."  
 "I or I (on behalf of my company and its contractors and agents), as the case may be, also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR100000. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to the to S. C. Department of Health and Environmental Control (DHEC) and/or the local implementing agency the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity." **(See Section 122.22 of S.C. Reg. 61-9 for signatory authority information.)** Having understood the above information, I am signing this certification as Primary Permittee to the aforementioned NPDES general permit."

_____ <b>Printed Name of Primary Permittee</b>	_____ <b>Title/Position</b>
_____ <b>Signature of Primary Permittee</b>	_____ <b>Date Signed</b>

## NPDES CGP FEE SCHEDULE A

(All Counties EXCEPT Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper)

The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the submitted check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received.**

<b>1. Identify (✓) the <u>Project Review Type(s)</u></b> Enter NPDES Coverage Fee of \$125 in the right-hand column if <u>any</u> of the following project/review types apply to this application. <u>Proceed to Item 2.</u>	(✓)	NPDES Coverage Fee
<b>a. Project or LCP (Item IV.G) that will ultimately disturb one (1) acre or more</b> <b>Note:</b> If your project will ultimately disturb less than one (1) acre <u>AND</u> is <u>NOT</u> a part of a Larger Common Plan, coverage under SCR100000 is <u>not</u> required; see <a href="http://www.scdhec.gov/administration/library/d-2628.pdf">http://www.scdhec.gov/administration/library/d-2628.pdf</a> (Notification Form for Sites Disturbing Less Than 1-Acre Not Part of a Larger Common Plan, Non-Coastal County")	<input type="checkbox"/>	\$._____.00
<b>b. New Owner/Operator (Transfer of Ownership)/Company Name Change</b> (\$125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)	<input type="checkbox"/>	
<b>c. Unpermitted Ongoing Project or Late Notification</b>	<input type="checkbox"/>	
<b>d. MS4 Project Review (Item I.A and I.B)</b> (\$125 payable to Department thru MS4 Reviewer)	<input type="checkbox"/>	
<b>e. Other (Specify):</b> _____	<input type="checkbox"/>	

<b>2. Determine the <u>Project Review Fees</u></b> (Review fees cannot exceed \$2000 for a project)		
PROJECT OR LCP THAT WILL ULTIMATELY DISTURB ONE (1) ACRE OR MORE	(✓)	Review Fees
a. Enter the disturbed area (Item IV.E) for this project. <u>Proceed to Items 2.b and 2.c.</u>		_____ (Nearest tenth of an acre)
b. Will this project or LCP (Item IV.G) ultimately disturb more than 1.0 acres	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Is this project exempt from S. C. Reg. 72-300 et seq.?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1. If this project will <u>not</u> ultimately disturb more than 1.0 acre, and is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Non-Coastal Counties". 2. If this project will ultimately disturb more than 1.0 acre, proceed to Item 2.d.		
<b>d. Enter the project review fees (based on \$100/disturbed area)</b> in the right-hand column. (Multiply the disturbed area (Item 2.a) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the right-hand column. <u>Review fees cannot exceed \$2000 for a project.</u>		\$._____.00

<b>3. Total Required Fees</b> Add the values in the right-hand columns of Items 1 and 2.d. <u>Proceed to Item 4.</u> (The Department will not review this project until all required fees are received).	\$._____.000
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**4. Identify the Method of Payment:**

**Payment by Check:**

Attach a signed and dated check payable to S.C. DHEC to the front of this Fee Schedule.  
Please note that all checks must be less than 30 days old and must be for the **entire required fees**.

**Payment by Credit Card:** (Check here if you wish to pay via credit card using the on-line payment system).

The Department will contact you to provide instructions and the invoice number necessary for online payment.  
Please provide an e-mail address where the invoice number may be sent: \_\_\_\_\_

**For official use only:** Invoice Number \_\_\_\_\_

## NPDES CGP FEE SCHEDULE B

(ONLY for Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties)

Submit payment for NPDES Coverage fees only to DHEC.

The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received and after the project is deemed consistent with the S.C. Coastal Zone Management Plan.**

<b>1. Identify (✓) the Project/Review Types</b>		(✓)	NPDES Coverage Fee(s)
(NOTE: You may <u>ONLY</u> select Item 1.a <u>OR</u> 1.b BELOW). Enter NPDES coverage fee of \$125 in the right-hand column if <u>any</u> of the following project/review types apply to this application. <b>Proceed to Item 2.</b>			
a. Project or LCP that is located within ½ mile of CRW (Item V.A) that will ultimately disturb more than 0.5 acres (if select a, do not select b)		<input type="checkbox"/>	\$_____ .00
b. Project or LCP that is NOT located within ½ mile of CRW (Item V.A) that will ultimately disturb one (1) acre or more (if select b, do not select a)		<input type="checkbox"/>	
c. New Owner/Operator (Transfer of Ownership)/Company Name Change (\$125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)		<input type="checkbox"/>	
d. Unpermitted Ongoing Project or Late Notification		<input type="checkbox"/>	
e. MS4 Project Review (Item I.A and I.B)		<input type="checkbox"/>	
f. Other (Specify): _____		<input type="checkbox"/>	
<b>2. Determine the Project Review Fees</b> (Review fees cannot exceed \$2000 for a project). NOTE: COMPLETE ITEM 2.a BELOW. COMPLETE EITHER SECTION 3 OR SECTION 4. <b>DO NOT COMPLETE BOTH SECTIONS.</b>			
a. Enter the disturbed area (Item IV.E) for this project. <b>Proceed to Item 3 OR Item 4.</b>		_____ (nearest tenth of an acre)	
<b>3. PROJECT OR LCP LOCATED WITHIN ½ MILE OF A CRW (ITEM V.A)</b>		(✓)	Review Fees
a. Will this project or LCP (Item IV.G) ultimately disturb more than 0.5 acres?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Is this project exempt from S. C. Reg. 72-300 et seq.?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>1. If this project will <u>NOT</u> ultimately disturb more than 0.5 acres and is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See section 1.3.1.B. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Coastal Counties".</p> <p>2. If this project or LCP will ultimately disturb more than 0.5 acres, <b>proceed to Item 3.c.</b></p>			
c. Enter the project review fees (based on \$100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the right-hand column. <b>Review fees cannot exceed \$2000 for a project. Proceed to item 3.d</b>		\$_____ .00	
d. Total Required Fees (Coastal Project located WITHIN ½ mile of a CRW (Item V.A) Add the values in the right-hand columns of Items 1 and 3.c. (The Department will not review this project until all required fees are received). <b>Proceed to Item 5.</b>		\$_____ .00	
<b>4. PROJECT OR LCP NOT LOCATED WITHIN ½ MILE OF A CRW (ITEM V.A)</b>		(✓)	Review Fees
a. Will this project or LCP (Item IV.G) ultimately disturb one (1) acre or more?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Is this project exempt from S. C. Reg. 72-300 et seq.?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>1. If this project <u>will NOT</u> ultimately disturb one (1) acre or more, and is not part of an LCP, coverage under SCR100000 is <u>NOT</u> required; see the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Coastal Counties".</p> <p>2. If this project or LCP <u>will</u> ultimately disturb one (1) acre or more, <b>proceed to Item 4.c.</b></p>			
c. Enter the project review fees (based on \$100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the right-hand column. <b>Review fees cannot exceed \$2000 for a project. Proceed to item 4.d.</b>		\$_____ .00	
d. Total Required Fees (Coastal Project NOT located WITHIN ½ mile of a CRW (Item V.A) Add the values in the right-hand columns of Items 1 and 4.c. (The Department will not review this project until all required fees are received). <b>Proceed to Item 5.</b>		\$_____ .00	

**5. Identify the Method of Payment:**  **Payment by Check:** (Attach a signed and dated check payable to S.C. DHEC to the front of this fee schedule. All checks must be less than 30 days old and must be for the entire amount of required fees). .  **Payment by Credit Card:** (Check here if you wish to pay via credit card using the on-line payment system). The Department will contact you via e-mail to provide instructions and the invoice number necessary for online payment. **Please provide an e-mail address where the invoice number may be sent:**

**For official use only: Invoice Number** \_\_\_\_\_

## Instructions for Completing the Notice or Intent (NOI)

If you are uncertain whether you need to obtain coverage under the NPDES General Permit for Stormwater Discharges from Construction Activities, SCR100000 (CGP), if you cannot access the websites listed on the NOI and instructions, or if you have any other questions, contact the Stormwater Permitting Section (SWP) at (803) 898-4300 or Coastal Stormwater Permitting Section (CSWP) at (843) 953-0200. Projects located in the S.C. Coastal Zone (SCCZ—Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties) are reviewed by CSWP. Please see the Bureau of Water, Stormwater Permitting website (BOW-SPWS): <http://www.scdhec.gov/environment/water/swater/> for guidance and additional information regarding the CGP.

### Who Must File a NOI:

- If S.C. Department of Transportation (SCDOT) is the Primary Permittee (Owner/ Operator), this NOI form (Form 2617) should not be used.
- The Owner/ Operator of a single project or larger common plan for development or sale (LCP—see item IV.G of instructions) that will ultimately disturb 1 acre or more (all counties).
- In the SCCZ, the Owner/Operator of a single project or LCP that is located within ½ mile of a coastal receiving water (CRW) (See item V.A of the instructions) and will ultimately disturb more than 0.5 acres.
- See the BOW-SPWS for “Less Than 1-Acre of Land Disturbance - Non-Coastal Counties” and “Less Than 1-Acre of Land Disturbance - Coastal Counties”.

### Where to File:

See the BOW-SPWS for a current list of the areas that are reviewed by Municipal Separate Storm Sewer System (MS4) operators and entities that have delegated review authority. For projects in these areas, the initial submittal should be made to the MS4 operator; if initial submittal is made to DHEC for projects in these areas, the review process may be delayed. Please contact the appropriate entity for additional information and requirements; for example, the MS4 operator may require that a different application form be submitted. If a project crosses jurisdictional boundaries (e.g., sewer line in Greenville County and the city of Mauldin), then submittals to all appropriate MS4 operators, delegated entities, and DHEC must be coordinated.

Projects Located in the SCCZ	All Other Areas
<b>S.C. DHEC—Bureau of Water Coastal Stormwater Permitting Section 1362 McMillan Ave., Suite 400 Charleston, S.C. 29405</b>	<b>S.C. DHEC—Bureau of Water Stormwater Permitting Section 2600 Bull Street Columbia, SC 29201-1708</b>

### Submittal Package for SWP and CSWP:

- When DHEC performs a full technical review, you must include the original, signed NOI form, appropriate fee schedule (A or B) with required fees, one (1) copy of the Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP), and one (1) copy of all other supporting documentation with the initial submittal. For projects in the **non coastal counties** disturbing **greater than or equal to 1 acre and less than or equal to 2 acres**, one (1) copy of the C-SWPPP and one (1) copy of supporting documentation can be submitted with the initial submittal. In the **SCCZ**, applications for Coastal Zone Consistency certification are to be filed with requests for NPDES construction coverage and will then be routed internally to the Office of Ocean and Coastal Resource Management (OCRM) for review. OCRM submittal requirements can be located at: <http://www.scdhec.gov/environment/ocrm/czc.htm>
- When a regulated MS4 or entity implementing Regulation 72-300 performs the technical review, you must include a copy of the MS4 approved NOI form or MS4 approved application, the \$125 NPDES fee, and one (1) copy of the MS4 approval. In the **SCCZ**, applications for Coastal Zone Consistency certification are to be filed with requests for NPDES construction coverage and will then be routed internally to OCRM for review.
- For projects ultimately disturbing more than 1 acres, the checklist must be completed and attached when DHEC reviews your C-SWPPP. In the **SCCZ**, for projects ultimately disturbing more than 0.5 acres and located within ½ mile of a CRW, the checklist must be completed and attached. See BOW-SPWS for the most current version of the checklist. If this project will **NOT** ultimately disturb more than 0.5 acres (Coastal Counties) or more than 1.0 acre (Non-Coastal Counties) AND is not part of an LCP, **your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required.** See the BOW-SPWS for “Less Than 1-Acre of Land Disturbance - Coastal Counties AND “Less Than 1-Acre of Land Disturbance - Non-Coastal Counties.
- For Modification projects where DHEC performs a technical review, see Section I of the instructions and Form B. Complete the applicable sections of the NOI Form. Complete the Form B Checklist. Submit an original, signed NOI form, appropriate fee schedule (C) with required fees, one (1) copy of SWPPP revisions, and one (1) copy of all other supporting documentation, including necessary engineering calculations. **No review clock is required for Modification reviews.**

Authorization to discharge is granted based on the timeframes specified in the table below. For project sites located in the SCCZ, the timeframes provided below do not commence until a Coastal Zone Consistency determination has been issued for the site.

Review Type	Allotted Review Time Frame
Regulated MS4 or entity implementing Regulation 72-300	<b>7 business days of DHEC receipt of a complete NOI and fee payment.</b>
DHEC (when construction site is subject to State C-SWPPP reviews)	<b>20 business days of DHEC receipt of a complete NOI and fee payment.</b>

### S.C. Coastal Zone (SCCZ) Requirements:

For projects that are located within ½ mile of a CRW and involve greater than 0.5 acres of land disturbance, a registered engineer, landscape architect, or Tier B surveyor must prepare, amend when necessary, certify, and stamp the C-SWPPP as required and allowed by the qualified individual's respective act and regulations. Regulation 72-307(C)(5)(g) establishes additional requirements for projects located in the **SCCZ**. The additional water quality measures are outlined in Chapter III, Section XIII of the South Carolina Coastal Zone Management Program, as refined available at <http://www.scdhec.gov/environment/ocrm/czmp.htm>

### Fee Schedules:

Make sure to answer all applicable questions on the appropriate Fee Schedule. **Complete Fee Schedule A for Non-Coastal projects; Schedule B for Coastal projects. Attach Form A, as required, for Transfer of Ownership. Attach Form B for major modifications to a prior approved project with Fee Schedule C if DHEC reviews your modification.**

### Office Mechanics and Filing:

The original NOI form for projects located outside of MS4 areas and supporting documentation will be kept in the Central Office files (hard copy or digitized copy) in accordance with the Retention Schedule.

**Date:** Enter today's date.

**Project/Site Name:** The Project/ Site Name should be a unique or distinguishing name (e.g., not Proposed Subdivision).

**NOTE:** DHEC must be notified in writing if the Project/ Site Name changes.

**County:** If the project is in multiple counties, list the county in which the majority of the site is located. **If part of the project is in the SCCZ, then list the coastal county in which the majority of the site is located and submit the project to CSWP;** see the "Where to File" section. List the other counties in which the site is located in the C-SWPPP.

**Prior Approved NPDES Permit Number (Major Modification or Change of Information Only):** Provide the NPDES permit number (SCR number) or File Number previously assigned to the project or LCP.

**Expedited Review Program (ERP):** For additional information about ERP, see the ERP website <http://www.scdhec.gov/environment/water/swater/expeditedReview.htm>. DHEC will notify the Project Owner/ Operator if the project is selected for review in the ERP. There are additional required fees for participation in this program; these ERP fees should not be submitted until DHEC has notified the Project Owner/ Operator that the project was selected for participation in the ERP. **In the SCCZ, please note that projects impacting Geographic Areas of Particular Concern (GAPCs) and/or wetlands may not eligible for participation. Consult OCRM staff.**

I. **Notice of Intent (NOI) Application Type(s)** (See Section 2.4 of CGP for submission deadlines and notification requirements)

A. **Project (Application) Type** - Select **ALL** applicable application types that best describe your project or application. Section 2 of the Construction General Permit (CGP) may be reviewed for further information on each type of application listed in this section. As an example, if your project is one that is a new startup, then "New Project" should be selected. If your project is a new startup that will be located in Beaufort County, that will also be expedited, then "New Project", "OCRM Project Review", and "Expedited Review Program" should each be selected to describe your application. **To determine if the project design is considered to be above regulatory requirements or Low Impact Development, see the "Expedited Review Standard Operating Procedures" document.** If **none** of the application types listed in this section apply or clearly define the intent of your project, select "Other" and provide specific details that clearly describe the intent of your NOI application.

**NOTE:** DHEC must be notified in writing within fourteen (14) business days of a new Owner (person, lending institution, government institution, etc.) taking title to or ownership of a prior approved ongoing NPDES construction project/site. A new Property Owner must complete all applicable sections of Form A (Transfer of Ownership) and submit this form to the Department or respective MS4 with the NOI application. Written notification is also required when the Owner or Developer's company name changes for a prior approved construction permit.

**NOTE:** Major Modifications allowed by the Department are listed in Section 3.1.7 of the CGP. If your project is a major modification, complete Form B, Fee Schedule C, and applicable sections of the NOI per directions identified on Form B. Please note that Section V (Waterbody Information) of the prior approved NOI must be reviewed for changes prior to submitting any modification request to the Department. If changes have occurred, identify as Change of Information on the NOI form and provide the revised information in this section. Attach a detailed Narrative and revised C-SWPPP documents to the major modification request.

A. **MS4 Reviewer and MS4 Operator** - If this project is located inside a Municipal Separate Storm Sewer System (MS4) and must be reviewed and approved by a MS4 entity prior to submission to DHEC, then select "MS4 Project Review" as application type in Item A and provide the names of the entities that will perform the review and the MS4 Operator. Urbanized area boundary maps are available at <http://cfpub.epa.gov/npdes/stormwater/urbanmapresult.cfm?state=SC>. See the following website for information about MS4s: <http://www.scdhec.gov/environment/water/swnsm4.htm>. Note: Some MS4s have increased their review jurisdiction boundaries beyond the original urbanized area map. Please confirm with the appropriate MS4 regarding review jurisdiction.

### II. **Primary Permittee Information**

Identify whether the Primary Permittee is a person or a company. If a company, identify if it is a lending institution or government entity. Provide the Employer Identification Number (EIN) as established by the U.S. Internal Revenue Service for the company. **The EIN is commonly referred to as the taxpayer ID. If the company does not have an EIN (e.g., single member LLC, sole proprietorship). DO NOT list a Social Security number**

- A. **Primary Permittee Name** - Provide the complete, legal name of the person or entity (company) that will be the Primary Permittee (Owner/Operator, O/O) for the project. If a person, provide the Title or Position. If a company, provide the complete, legal name of the company. Do not list the D/B/A (Doing Business As) name. **NOTE: If S.C. Department of Transportation (SCDOT) is the O/O, this NOI form (Form 2617) should NOT be used.** Provide the complete mailing address of the person/company identified in II.A as the Primary Permittee.
- B. **Contact/ODSA Name** – Complete if different from II. A or O/O is a company. Provide the complete legal name of the person identified as the Contact or Operator of Daily Site Activities (ODSA) for the project. This can be someone other than the person that has signatory authority for the company. Often the Contact person is also referred to as the ODSA. Provide the complete mailing address for the person, other than the permittee, the Department may contact. This address can be different from the mailing address entered for the O/O.
- C. **Property Owner Name** – If different from II.A or B, list the complete, legal name of the current Property Owner(s) of the site. Enter the complete mailing address for the Property Owner. **NPDES coverage will be issued to the Primary Permittee identified in Section II.A, not the Property Owner, unless same entity.** If there are multiple Property Owners, attach additional sheets with all information requested in Section II.C.

### III. **Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information**

- A. **C-SWPPP Preparer Name** – Provide the name of the C-SWPPP Preparer for this project.
- B. **Registered Professional** – Identify whether the C-SWPPP Preparer is a Registered South Carolina Professional Engineer, Tier B Surveyor, or Landscape Architect. For projects disturbing more than 2 acres, the C-SWPPP preparer must be one of the listed professionals or federal government employee as described in Title 40, Chapter 22, and as required and allowed by the qualified individual's respective act and regulations. **In the SCCZ, projects that are located within ½ mile of a CRW and that involve greater than 0.5 acres of land disturbance, the C-SWPPP preparer must be one of the listed professionals or federal government employee as described in Title 40, Chapter 22, and as required and allowed by the qualified individual's respective act and regulations.**
- C. **Company/Firm Name** - Provide the complete, legal name of the company and S.C. Certificate of Authorization (S.C. COA number). Enter the complete mailing address. DHEC may contact the C-SWPPP Preparer via email. See the following websites for information about COA requirements for Landscape Architecture firms <http://www.dnr.sc.gov/land/LandscArch/LAlicense.html> and Engineering and Surveying firms <http://www.lir.state.sc.us/POL/Engineers/>. Enter N/A for S.C. COA if the firm is not required to have a COA.

### IV. **Project/Site Information**

- A. **Type of Construction Activity (ies)** - Select **ALL** activity types that best describe the development proposed for the site. "Institutional" includes schools and other publicly owned projects, except linear projects. "Site Preparation" includes clearing, grubbing, and grading only; no new impervious areas should be proposed if this activity type is selected. If none describe the development, then select "Other" and list the activity.
- B. **Site Address/Location** - List the site address. If the site address is unknown, list the road name(s) on which the site is located, the nearest intersection, or other detailed description of the site location. List a city/town only if the site is within the city/ town limits. List zip code (if known). Provide the latitude/longitude and tax map numbers. See the following website for assistance in obtaining latitude/ longitude coordinates: [http://www.epa.gov/tri/report/siting\\_tool/index.htm](http://www.epa.gov/tri/report/siting_tool/index.htm). Latitude (from 32° to 35°) and longitude (-78° to -83°) should be for the center of the site. Minutes (') and seconds (") should be from 0 to 59. Identify the lat/long data source.
- C. **Indian Lands** – Identify if this site is located on Indian lands.
- D. **Proposed Start Date/Completion Date** – Provide proposed project start and completion dates.
- E. **Disturbed Area/Total Area** - Enter the disturbed area for the project and the total area for the site. The disturbed areas must be **rounded to the nearest tenth of an acre**. For subdivisions, if the exact build-out is not known, the disturbed area can be estimated using the following equation:  
**Disturbed area= 2(Maximum Footprint of House)(# of lots) + Road/ Right-of-Way areas + Other easements/ disturbance.** **NOTE: Provide written notification if the actual disturbed area exceeds the disturbed area on the approved NOI.**
- F. **Modification Only: Change to Disturbed Area** – If your modification to a prior approved project will increase or decrease the disturbed area, complete this section and see Section I of the Instructions. Enter the current approved disturbed area and proposed increase (+) or decrease (-) to the disturbed area. If no change, enter 0.0. Enter the new total disturbed area (after change). Round each entry to the nearest tenth of an acre.
- G. **Larger Common Plan for Development or Sale (LCP)** - The plan in LCP is "broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot." [63 Federal Register No. 128, July 6, Page 6 1998, p. 36491] For example, if master calculations have been prepared and/ or submitted for an entire site, then all phases and parcels at that site would be considered part of an LCP. If the site is part of a subdivision, industrial park, commercial park, etc., then it is considered to be part of an LCP. List a unique, distinguishing LCP/ Overall Development name. This name should not reference a specific phase. This LCP/ Overall Development name should also be listed on all NOIs for future projects that are part of this LCP, including subsequent phases. Check the box if this is the first phase of the LCP. List the previous state permit/ file number and previous NPDES coverage number if applicable. **(DO NOT enter SCR100000). If not known, contact the Department for assistance.**



- H. **Flooding Problems** – Identify whether flooding problems exist on the site, or downstream or adjacent to the site. If yes, provide detailed explanation of the extent and impact in your C-SWPPP. **NOTE:** All C-SWPPP applications must include a Floodway Map/FEMA Flood Insurance Map (See Checklist) with an outline of the project boundary on the map. **NOTE:** The Department does not regulate the placement of fill in floodplains. Contact local city or county official.
- I. **Active S. C. DHEC Warning Notice/Notice to Comply/Notice of Violation** – Select yes if DHEC has issued a Warning Notice, Notice to Comply, or Notice of Violation for the site or any site within the LCP. Provide additional information about the Notice (e.g., Order number) and a copy of correspondence with DHEC regarding the Notice in your C-SWPPP.
- J. **State and Federal Environmental Permits or Approvals** – List relevant state and federal permits applied for. See §122.21(f) of S.C. Regulation 61-9 <http://www.scdhec.gov/environment/water/regs/r61-9.pdf> for a list of permits, approvals, and programs that should be considered. If inaccurate, NPDES coverage may be invalid.
- K. **Waiver(s)** - Identify any waivers requested for your project or construction site. Provide details and required justifications in the C-SWPPP.

## V. Waterbody Information

### A. Receiving Waterbody(s) (RWB) Information

1. The **Nearest** receiving waterbody (RWB) is the nearest Waters of the State (WoS). See definition in §122.2 of S.C. Regulation 61-9 - <http://www.scdhec.gov/environment/water/regs/r61-9.pdf> to which the site's stormwater discharges will drain. The nearest RWB must be listed in reference to a named waterbody, if the RWB is unnamed. For example, if the site's stormwater discharges drain to a stream on the site, then the nearest RWB would be the stream. If the stream is not named, then determine the nearest named waterbody (e.g., Grove Creek) into which the stream will flow and list the nearest RWB as a tributary to the named waterbody (e.g., Tributary to Grove Creek). Then, the **Next Nearest** named RWB would be Grove Creek. If the site's stormwater discharges drain to multiple waterbodies, then list all such waterbodies; attach additional sheets, if necessary.
2. Provide the **distance**, in feet to each receiving waterbody.
3. Provide the **classification** for each named waterbody. See S.C. Regulation 61-69 (<http://www.scdhec.gov/environment/water/regs/r61-69.pdf>) for a list of classifications of waterbodies within S.C. If the nearest RWB is unnamed, then search the document for the nearest named RWB. If the nearest, named RWB is not listed, then continue searching the document for the next, named waterbody, proceeding downstream from the site. For example, a site in Anderson County drains to a tributary of Hornbuckle Creek, then to Hornbuckle Creek, then to Middle Branch, and then to Brushy Creek/ Big Brushy Creek. First, search the document for Hornbuckle Creek, then Middle Branch, then Brushy Creek. Because there are 3 listings for Brushy Creek, the next, named waterbody (Saluda River) must be determined. Note that the county for this record for Brushy Creek is listed as Pickens because the headwaters of Brushy Creek are in Pickens County. The classification of the tributary to Hornbuckle Creek is "FW—Freshwaters".
4. **SCCZ Only:** Provide the **Coastal Receiving Water (CRW)** to which the site's stormwater discharges will drain. This distance is used to determine permitting requirements. Coastal Receiving Water is defined as a receiving water body as defined in the [Policies and Procedures of the South Carolina Coastal Zone Management Program, updated July 1995](#). This includes all regularly tidally influenced salt and fresh water marsh areas, all lakes or ponds which are used primarily for public recreation or a public drinking water supply, and other water bodies within the coastal zone, excluding wetlands, swamps, ditches and stormwater management ponds which are not contiguous via an outfall or similar structure with a tidal water body.
5. Provide the distance, in feet to the CRW. **Classification of RWB is not applicable for CRW.**

### B. Waters of the U. S. /State Information (See Section 2.6.2 thru 2.6.6 of the CGP)

1. Complete the "On the Site?" column for items a-d. If yes is selected for that column, then the next 3 columns must be completed. If there are other waters of the U.S./ State (WoS) on the site not listed in items a and b (e.g., stream, river, lake, pond), then list those in item c. Jurisdictional wetlands are under ACOE jurisdiction.
2. **Delineation** means identification by U.S. Army Corps of Engineers (USACOE) or wetlands consultant. Also, see the checklist for information about delineation requirements. If there are WoS within 100' of the disturbed area that were not delineated/identified, then explain this in the narrative; this includes WoS that are not on the project site but are within 100' of the disturbed area. **For Direct Critical Area in the SCCZ, delineation means identification by OCRM or wetlands consultant. OCRM staff may require identification of Direct Critical Area by OCRM staff as part of its Coastal Zone Consistency review.**
3. **Impacts** - If construction activities will occur in and/ or will impact WoS, then select yes for "Impacts?"
4. **Amount of Impacts** - List the amount of impacts to WoS. Provide an additional, separate plan sheet that shows all WoS on the site and the impacted areas. If there are proposed impacts to WoS, please contact USACOE (866-329-8187) and S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting this NOI. **In the SCCZ, also contact S.C. DHEC OCRM Wetlands Section (843-953-0200). Please note that it is the Project Owner/ Operator's responsibility to ensure that all WoS are shown and identified in the C-SWPPP. See Sections 2.6**
6. **If yes for impacts in B.3, describe each impact and activity, and list all permits** (e.g., U.S. Army Corps of Engineers (USACOE) Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact. Describe the activity(s), whether the impact is permanent or temporary, and any other relevant information. Provide a copy of all permits and certifications for and correspondence with USACOE and DHEC for the impacts. Include all plats referenced in the permits or correspondence.

**C. S. C. Navigable Waters (SCNW) Information**

1. **Are SCNW on the site?** See <http://www.scdhec.gov/environment/water/navwater.htm> for the definition of SCNW and other information related to SCNW. Or, contact S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section at (803) 898-4300 for assistance determining the navigability of the waters on your site or with questions related to SCNW. **If yes to C.1**, list the **name of the SCNW**. If the SCNW is not named, then provide a description that references the nearest, named waterbody (e.g., tributary to Grove Creek). **If no to C.1**, do not complete questions C.2 thru C.3 of this section.
2. If yes to C.1 and construction activities proposed by your project will cross over or occur in, under, or thru the SCNW, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.). This includes temporary and permanent crossings with roads, utility lines, etc.
3. Identify permits providing SCNW Activity(ies) coverages for your site.
  - a. Identify proposed activities covered under a DHEC General Permit or other DHEC permit. Identify permit number(s) and corresponding activities covered under each. See the following website for a list of DHEC General Permits for activities in some SCNW: <http://www.scdhec.gov/environment/water/docs/gp/gp.xls>. See the "Notes" column to determine what types of activities are covered under each permit.
  - b. Identify **USACOE 404 Permit or 401 Certification** issued for the site. Identify permit number(s) or certification(s) and corresponding activities covered under each.
  - c. If applicable, identify the date the **SCNW permit** was applied for. Identify whether the permit applied for will cover ALL activities listed in C.2 of some activities listed in C.2. List covered activities.
  - d. If a **SCNW permit** has NOT already been applied for or issued for all of the activities in SCNW for this site, then those activities and conditions can be addressed during the review of the C-SWPPP, and a separate State Navigable Waters permit is not required. **Provide an additional plan sheet with plan and profile views (drawn to scale) of SCNW and associated activities; include activities description on the plan sheet.**

**D. Impaired Waterbodies Information (Section 3.2.12)**

**NOTE:** The TMDL, 303(d), and Non-Point Source water quality tool is a mapping system showing detailed information on WQMS locations, water quality status, and much more. The tool is available at the following website along with instructions for using the tool: <http://www.scdhec.gov/environment/water/tmdl/>.

**In the SCCZ**, list the nearest upstream and downstream DHEC WQMS(s) and corresponding waterbody(ies). Additionally, shellfish stations only monitor for Fecal coliform bacteria. Include both the nearest shellfish monitoring station(s) and full WQMS(s) on the NOI for both upstream and downstream locations when shellfish monitoring stations are present. If a shellfish monitoring site is not present then you only need to list the full WQMS(s). When a shellfish monitoring station is present, everything but Fecal coliform bacteria needs to be assessed at the full WQMS(s). Shellfish monitoring stations begin with numbers and full WQMS(s) begin with letters.

**1. 303(d) Listed Impaired Waterbodies**

- a. List the **nearest SCDHEC Water Quality Monitoring Station(s)** to which the site's construction stormwater discharges will drain and its **corresponding waterbody**. See the following website for the most current 303(d) List for Impaired Waters and related information: <http://www.scdhec.gov/environment/water/tmdl/>. **NOTE: DHEC has determined that construction SW discharges are expected to contain pollutants causing the following impairments: TURBIDITY, BIO (Macroinvertebrate), TP (Total Phosphorus), TN (Total Nitrogen), Chlorophyll-a, and FC (Fecal coliform) in Shellfish Harvesting Waters in the SCCZ.** Carefully evaluate whether the site's construction SW discharges will contain any pollutants causing other impairments not explicitly listed above. You should also consider previous land uses at the site in answering this question. For example, if the previous land use was a copper processing facility and the impairment at the nearest WQMS is copper, then you should carefully evaluate whether the site's construction SW discharges would contain copper.
- b. Identify whether this **WQMS is listed on the most current 303(d) List**. The 303(d) list is available in Microsoft Excel and Adobe Reader formats. WQMS locations are available for each watershed at the website provided in 1.a as well using the **TMDL, 303(d), and Non-Point Source water quality tool**. To search the 303(d) list to determine whether a WQMS is listed, select "Edit" from the top toolbar of your web browser. Then, select "Find". Enter the WQMS exactly as listed on the map and hit enter. **If none of the WQMS(s) are found, then select "No" and proceed to item V.D.2 (TMDL Impaired Waterbodies). If any of the WQMS(s) are found, then select "Yes" and proceed to item c.**
- c. **If yes for b**, list the impairment(s) or pollutants identified as cause(s) of the impairment (see last column labeled "CAUSE") for the WQMS(s) and proceed to item d.
- d. Identify whether the site's stormwater discharges contain any pollutants causing the impairment(s). **If no for d, proceed to item V.D.2 (TMDL Impaired Waterbodies). If yes to d and the receiving water is listed on the most current 303(d) List of Impaired Waters** for a sediment or a sediment-related parameter, BIO (macroinvertebrate), turbidity, Total Phosphorous, Total Nitrogen, Chlorophyll-a, or Fecal coliform in Shellfish Harvesting Waters in the SCCZ. You must carefully evaluate all selected BMPs and their performance to ensure that the construction site's Stormwater discharges will not contribute to or cause a violation of water quality standards. **If yes for d and the disturbed area is less than 25 acres**, include an evaluation of the Best Management Practices (BMPs) proposed for the site as described in Section 3.2.12.B(l) of the CGP in the C-SWPPP. **If yes for d and the disturbed area is greater than or equal to 25 acres**, then provide a written qualitative and quantitative assessment of the BMPs proposed in the C-SWPPP for the site as

described in section 3.2.12.B(II) of the CGP. For more information on this subject, please see the DHEC publication entitled "Antidegradation for Activities Contributing to NonPoint Source Pollution to Impaired Waters." This publication can be downloaded at the following DHEC WEB site [www.scdhec.gov/eac/water/pubs/antidegnps.pdf](http://www.scdhec.gov/eac/water/pubs/antidegnps.pdf).

- e. **If yes to d, list the "USE" support impairment (AL, FISH, REC, SHELLFISH) affected by the pollutant or impairment listed in item c.**
- f. **If yes for d, will use of the BMPs proposed for your project ensure the stormwater discharges leaving the site will NOT contribute to or cause further water quality standard violations for the impairment(s) listed in c?**  
**NOTE: If your answer to item f is NO, this site is NOT eligible for coverage under the CGP.** You may contact the Department to determine if an individual permit application is necessary or you may revise your project to include appropriate Best Management Practices, controls, and procedures to bring your discharge into compliance

## **2. TMDL Impaired Waterbodies**

- a. List the **nearest SCDHEC water quality monitoring station(s)** to which the site's construction stormwater discharges will drain. List WQMS identified in part V.D.1.a of this table.
- b. Identify whether a TMDL is listed for this WQMS. NOTE: See the following website for a list of all WQMS with Approved S.C. Total Maximum Daily Loads (TMDLs): <http://www.scdhec.gov/environment/water/tmdl/>. Select "Approved SC TMDLs", then select "[Sites Covered Under an Approved TMDL and Corresponding WQ Attainment Status](#)". Select "Edit" from the top toolbar. Then, select "Find". Enter the WQMS exactly as listed and hit enter.  
**If a WQMS is NOT found, then select "No," Stop and proceed to Section VI. If a WQMS is found, then select "Yes" and proceed to item c.**
- c. **If yes for b, identify and list the impairment(s) or pollutants listed as CAUSE(S) of the impairment (see 7th column labeled "CAUSE") and proceed to item d. If the WQMS(s) is impaired for more than one parameter, then the WQMS will be listed multiple times on successive rows.**
- d. **If yes for b, identify whether the standard has been ATTAINED for the impairment(s). NOTE: See the 8th column labeled "USE SUPPORT" to determine if the standard has been attained for each impairment for each WQMS. "FULLY SUPPORTED" means the standard has been attained for the impairment listed in the "CAUSE" column. "NOT SUPPORTED" means that the standard has NOT been attained for that impairment. If no for d (the standard has NOT been attained (NOT SUPPORTED) for all impairments for all WQMS(s)), proceed to item e. If yes for d (the standard has been attained for all impairments for all WQMS(s)), proceed to Section VI.**
- e. Identify whether the site's stormwater discharges contain any pollutants causing the impairment(s). **If no for e, proceed to Section VI. If yes for e, proceed to f.**
- f. **If yes for e, are your discharges consistent with the assumptions and requirements of the TMDL(s)? NOTE: If your answer to item f is NO, this site is NOT eligible for coverage under the CGP.** You may contact the Department to confirm that adherence to a C-SWPPP that meets the requirements of the CGP will be consistent with the TMDL. Where a TMDL has not specified a WLA applicable to construction stormwater discharges, but has not specifically excluded these discharges, adherence to a C-SWPPP that meets the requirements of the CGP will generally be assumed to be consistent with the approved TMDL. If the TMDL specifically precludes such discharges, the site is not eligible for coverage under the CGP.

**VI. Signatures and Certifications DO NOT SIGN IN BLACK INK!** The NOI must have original signatures unless the application being submitted to DHEC is one approved by an MS4.

**C-SWPPP Preparer** - The same registered professional must sign and seal the NOI form, C-SWPPP, calculations, and supporting documentation.

**Primary Permittee** - If the Primary Permittee or Project Owner/ Operator is a company, print the name of the person who is signing the NOI for the Owner/ Operator. A person with signatory authority for the Owner/ Operator must sign the application. The C-SWPPP Preparer cannot sign the application for the Owner/ Operator. The C-SWPPP, all reports, including monthly reports, and any information requested by DHEC must be prepared under the direction or supervision of a person with signatory authority for the Owner/ Operator or a duly authorized representative.

See below for a summary and §122.22 of S.C. Reg. 61-9 (Appendix C of the CGP) for complete information about signatory authority requirements.

- Corporation: A responsible corporate officer (e.g., president, vice-president, certain managers)
- Partnership or Sole Proprietorship: A general partner or the proprietor, respectively
- Municipality, State, Federal or Other Public Agency: Principal executive officer or ranking elected official.

**Appendix D**

**Stormwater Practices Permanent  
Maintenance Covenants**

# Horry County Stormwater Practices Permanent Maintenance Covenants

THE TERM STORMWATER SYSTEMS MAY REFER TO WATER QUANTITY AND/OR WATER QUALITY FACILITIES, AND BEST MANAGEMENT PRACTICES, BMPs (i.e., detention basins, retention basins, stormwater ponds, stormwater wetlands, water quality buffers, swales, ditches, pipes, inlets, separators, filtering devices, water quality structures, etc.)

THIS Covenant made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between \_\_\_\_\_ (Insert Full Name of property owner) \_\_\_\_\_ hereinafter called the "Owner", and Horry County, South Carolina hereinafter called the "County".

WHEREAS, the Property Owner is the owner of certain real property described as Horry County Tax Map Number, (TMS#) \_\_\_\_\_ as recorded by deed in the Horry County Register of Deeds (ROD), Deed Book \_\_\_\_\_ Page \_\_\_\_\_, hereinafter called the "Property;" and

WHEREAS, the Owner is proceeding to, or has, made improvements on the Property; and

WHEREAS, the Site Plan/Subdivision Plan known as (Name of Plan/Development) \_\_\_\_\_

hereinafter called the "Plan," which is expressly incorporated herein by reference, as approved, or to be approved, by the County, provides for the construction and maintenance of stormwater facilities, BMPs, and improvements within the confines of the Property; and

WHEREAS, the County requires that on-site stormwater facilities, BMPs, and improvements as shown on the Plan be constructed and adequately maintained by the Owner, its successors and assigns, including any homeowners association;

WHEREAS, the Owner, its successors and assigns, understands that the execution and adherence to the provisions of this Covenant is a condition precedent to the County's permitting, and/or approving the Site Plan, Storm Water Management Plan, and/or Subdivision Plan for the Property and the development located thereon;

NOW, THEREFORE, in consideration of the foregoing premises and mutual covenants the parties hereby agree as follows:

1. The on-site stormwater facilities, BMPs, and, improvements shall be constructed, operated, and maintained by the Owner, its successors and assigns, in accordance with the approved Plan and specifications identified in the Plan, as well as in accordance with State and federal requirements, the Horry County Stormwater Management Ordinance and Stormwater Design Criteria Manual, and any and all other applicable County ordinances.
2. The Owner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater facilities, BMPs, and improvements on the Property. Adequate maintenance required by this Covenant shall include, but is not limited to, scheduled and corrective maintenance as described on/in the approved Plan and/or as described in the Horry County Stormwater Design Criteria Manual for all stormwater facilities, BMPs, and improvements intended to manage and/or control stormwater on the Property, with such facilities, BMPs, and improvements to expressly include, but not be limited to pipes, drainage structures, ditches, swales, vegetation, berms, pond areas, outlet structures, maintenance shelf(s) and access roads, or any other improvement associated with stormwater on the Property but excluding any such improvements located on, under, or within any publicly owned or dedicated rights-of-way in which State or County has accepted maintenance of the roadways and/or drainage facilities. Adequate maintenance is herein defined as keeping such stormwater

facilities, BMPs, and improvements in good working condition such that they satisfactorily perform their intended design functions.

3. The Owner, its successors and assigns, shall inspect the stormwater facilities, BMPs, and improvements as described on/in the approved Plan and/or as described in the Horry County Stormwater Design Criteria Manual to assure safe and proper functioning of the stormwater facilities, BMPs, and improvements located on the Property. Any and all deficiencies identified during such inspections shall be repaired as necessary at the Owner's expense. A detailed repair plan may be required to be prepared by a professional engineer, licensed in the State of South Carolina.
4. The Owner, its successors and assigns, hereby grants permission to the County, its authorized agents and employees, to enter upon the Property and to inspect the stormwater facilities, BMPs, and improvements as deemed necessary by the County for purposes of protecting the public health, safety or welfare, for purposes of investigating or inspecting any reported or suspected deficiencies in the stormwater facilities, BMPs, and improvements on the Property, for purposes of responding to or investigating citizens' complaints relating to the management or control of stormwater on the Property, or for any other purpose deemed necessary by the County. The County shall provide the Owner, its successors and assigns, with a copy of any inspection findings, as well as a directive to commence with any required repairs. To the extent that the County does not agree with or to the contemplated repairs proposed by the Owner, the County may submit an alternate repair plan to the Owner or require the Owner to submit a detailed repair plan prepared by a professional engineer, licensed in the State of South Carolina.
5. In the event the Owner, its successors and assigns, fails to maintain the stormwater facilities, BMPs, and improvements on the Property in good working condition acceptable to the County, or fails to make repairs as specified in the inspection report within a reasonable time frame as established by the County, with such time frame not to be shorter than thirty (30) days, the County may enter upon the Property and take any and all action necessary to correct deficiencies identified in the inspection report. The Owner, its successors and assigns, shall be responsible for any and all expenses incurred by the County in taking such corrective action. This provision shall not be construed to allow the County to erect any structure of a permanent nature on the land of the Owner outside the easement for the stormwater management/BMP facilities. It is expressly understood and agreed that this Covenant imposes no obligation or responsibility on the County to routinely maintain or repair any stormwater facilities, BMPs, and improvements located on the property.
6. In the event that the County performs or undertakes work of any kind pursuant to this Covenant or expends any funds or resources in performance of said work for labor, use of equipment, supplies, material, and the like, the Owner, its successors and assigns, shall reimburse the County upon demand, within thirty (30) days of receipt of same.
7. This Covenant shall impose no liability on the County with respect to the maintenance or repair of any stormwater facilities, BMPs, and improvements on the Property, nor does the County assume any obligation or duty to undertake or perform any action allowed for, or permitted by, this Covenant. The Owner, its successors and assigns, further agrees to indemnify and hold the County harmless from any liability arising out of the management, operation, maintenance, or failure of any stormwater facilities, BMPs, and improvement subject to this Covenant.
8. Notwithstanding any right extended to the County pursuant to this Covenant, it is expressly recognized and acknowledged that the County retains all prosecutorial rights and remedies available to it, including the enforcement of any and all applicable County ordinances, against the Owner, its successors and assigns, relating to the operation, maintenance, and/or repair of stormwater facilities, BMPs, and improvements located on the Property.
9. This Covenant shall be recorded among the land records of Horry County, South Carolina, and shall constitute running with the land, and shall be binding on the Owner, its administrators, executors, assigns, heirs and any other successors in interests, including homeowners associations.



**Appendix E**  
**Post-Construction Maintenance**  
**Templates**



# Horry County Post-Construction Best Management Practices Maintenance Plan Template



December 2015

# HORRY COUNTY POST-CONSTRUCTION BEST MANAGEMENT PRACTICES (BMP) MAINTENANCE PLAN TEMPLATE

The effectiveness of post-construction stormwater best management practices (BMPs) depends largely upon regular inspections and maintenance. It is the property owner's responsibility to inspect and maintain all permanent post-construction BMPs. Pertinent sections of this template (dependent on selected BMPs) may be included in the stormwater permit submittal package to supplement the **Stormwater Practices Permanent Maintenance Covenants** and provide information to owners and operators on what inspection and maintenance operations are necessary to keep selected BMPs in proper working order.

BMP maintenance falls into two categories: expected routine maintenance and non-routine (repair) maintenance. Routine maintenance is performed regularly to maintain both the appearance of the BMPs and to provide adequate functionality. Routine inspection and maintenance helps prevent potential nuisances (odors, mosquitoes, weeds, etc.), reduces the need for repair maintenance, and reduces the chance of polluting stormwater runoff by finding and fixing problems before future storm events.

The BMP Maintenance Plan Templates have been developed for the most common post-construction BMPs. The Templates outline the required activities to properly maintain the BMP and corresponding inspection schedules. Inspection and maintenance records must be maintained by the owner/operator and provided to Horry County upon request. During the permitting process, the design engineer may choose to customize and assemble appropriate templates for each post-construction BMP. In addition, all post construction maintenance plans may include the "General Site Information" sheet. The templates also include an inspection checklist the owner/operator may use during inspections. These inspection checklists should be retained as a record of inspection and maintenance activities performed. Horry County inspectors will also periodically inspect the post-construction BMPs.

## DESIGN ENGINEER INSTRUCTIONS

During the design process, the design engineer may include applicable maintenance templates and tailor each template and checklist to correspond with the project's post development BMP's. If the design engineer chooses to use the maintenance plan templates, sections A – C of the *Post Construction BMP Maintenance General Site Information* should be included.

The *Post Construction BMP Maintenance General Site Information* and *Stormwater Practices Permanent Maintenance Covenants* may be packaged together and considered the site's post-construction Maintenance Plan. The Maintenance Plan can be submitted to Horry County as part of the stormwater permit application package for approval.

## OWNER RESPONSIBILITY AND INSTRUCTIONS

After construction is complete, the owner is responsible for maintaining and inspecting all post-construction BMP's on the project site. During inspections, the owner (or his designated representative) should make a clean copy of the Maintenance Plan to update during the inspection as a record of the completed inspection. Section C on the Post Construction BMP Maintenance General Site Information page should be updated as needed. Section D should be filled out during every inspection. The inspection checklist should be followed by the owner and filled out as appropriate. Any needed maintenance activities should be documented and completed as soon as possible.

The Maintenance Plan should be stored on site and provided to any County Inspector upon request. Any deficiency found by a County inspector must be corrected by the owner in the requested time frame. If deficiencies are not corrected, enforcement actions will be pursued by Horry County.

## **COUNTY INSPECTOR RESPONSIBILITY AND INSTRUCTIONS**

The County Inspector is not required to use the included inspection forms during the periodic County Permanent BMP inspections; however, it is believed that using the forms would be beneficial as they specify the location and required maintenance for all site BMPs. During the inspection, the County inspector has the authority to request the inspection reports completed by the owner. In addition, any deficiencies found by the County Inspector should be documented and reported to the owner within two (2) business days. The owner will be required to correct the deficiency. If the deficiency is not corrected in a reasonable time frame, the County will implement enforcement measures.

## Post Construction BMP Maintenance General Site Information

### A. Site/Owner Information

Site Name	
TMS	
Site Address	
City, State, Zip	
Owner	
Owner Address	
City, State, Zip	
Phone Number	

### B. BMP Summary – List the name and type for all Post-construction BMPs on the site.

BMP Name	BMP Type

### C. Inspection Records

Contact Person	
Inspection Records Location	
Contact Number	

### D. Site Conditions at Time of Inspection

Date & Time	
Inspected By	
Weather Conditions	
Overall Site Conditions	

## **BUFFERS, FILTER STRIP, AND VEGETATED LEVEL SPREADER MAINTENANCE AND RESPONSIBILITY AGREEMENT**

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Buffers, Filter Strips, and Vegetated Level Spreaders. Owners must document Buffer, Filter Strip, and Vegetated Level Spreader deficiencies during inspections, and complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

BMP Name	
BMP Location on Site	
Comments	

### Required Maintenance:

- Immediately after the installation, water newly planted vegetation twice weekly until the vegetation becomes established (typically six weeks).
- Ensure the grass cover is a minimum of 70%. Re-sod or re-seed if necessary to ensure a minimum of 70% coverage of grassing/stabilization.
- Maintain stable groundcover in the drainage area to reduce any erosion/sedimentation.
- Remove debris and trash from buffers, filter strips and vegetated level spreaders.

### Inspections:

After vegetation is established, perform inspections once a quarter and after every storm event greater than 1.0 inch. Inspections are required annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

## BUFFERS, FILTER STRIP, AND VEGETATED LEVEL SPREADER INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
Evidence of erosion/sedimentation?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Minimum of 70% coverage of grassing/stabilization?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Debris & trash removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Inspected by: \_\_\_\_\_ Date: \_\_\_\_\_

## BIORETENTION AREA MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Bioretention Areas. Owners must document Bioretention Area deficiencies during inspections and complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

BMP Name	
BMP Location on Site	
Comments	

### Required Maintenance:

- Immediately after the installation of Bioretention Areas, plants must be watered twice weekly until the plants become established (typically six weeks).
- Replace mulch on the surface of the Bioretention Area as required to maintain the adequate depth.
- Do not drive heavy equipment over the Bioretention Area.
- Prevent sediment from discharging to the Bioretention Area.
- Replace dead or dying vegetation. Inspections:

After the Bioretention Area is established, perform inspections once a quarter and after every storm event greater than 1.0 inch for the first year. Inspections are required semi-annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

## BIORETENTION AREA INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
Is bioretention area present as per plans?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is the bioretention area the size as called for on plans?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Plant composition according to approved plan?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Vegetation overgrown?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Mulch replacement needed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Trash & debris removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Inlets or outlets obstructed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is there standing water longer than 24-hrs after a storm event?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Evidence of erosion?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Drainage area stabilized?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does filter material need cleaning?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is there significant plant die-off?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments:

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Inspected by: \_\_\_\_\_



## INFILTRATION TRENCH MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Infiltration Trenches. Owners must document Infiltration Trench deficiencies during inspections and complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

BMP Name	
BMP Location on Site	
Comments	

### Required Maintenance:

- Ensure the drainage area is stabilized to reduce sediment discharge.
- Clear debris and trash from inlets and outlets as needed.
- Keep grass height less than 6 inches.
- Replace the top 6-inch layer of pea gravel and the geotextile separating the pea gravel from the stone media when full of sediment.
- Record the water level in the monitoring wells after every storm event greater than 1.0 inch.
- Check the observation well after three consecutive days of dry weather after a rainfall event greater than 1.0 inch. If complete de-watering is not observed, there may be clogging within the trench requiring maintenance.
- Keep a record of the average de-watering time to determine when maintenance is required.
- If complete failure is observed, perform total rehabilitation by excavating the trench walls to expose clean soil and replacing gravel, geotextiles, and topsoil.

### Inspections:

After the Infiltration Trench is established, perform inspections once a quarter and after every storm event greater than 1.0 inch for the first year. Inspections are required annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

# INFILTRATION TRENCH INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
Inlets, trash racks, & outlets free of trash and debris?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Surrounding area fully stabilized (no evidence of eroding material/ sediment into BMP)?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is observation well dry 72 hours after a storm event? Record level in comments.	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Sediment accumulation in pea gravel?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Vegetation overgrown?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

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Inspected by: \_\_\_\_\_

## DRY DETENTION BASIN MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Dry Detention Basins. Owners must document Dry Detention Basin deficiencies during inspections and complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

The dry detention basin system is defined as the dry detention basin, outlet structure, and pretreatment system if provided.

BMP Name	
BMP Location on Site	
# of Inflow Pipes	
Forebay Present (Yes or No)	
Pond Outlet Type & Location	
Emergency Outfall Location	
Comments	

### Required Maintenance:

- Manage the contributing drainage area to reduce the sediment load.
- Immediately after installing the dry detention basin, water the vegetation twice weekly until the plants become established (typically six weeks).
- Only fertilize the dry detention basin according to the results of a soil analysis after the initial fertilization required to establish vegetation.
- Remove debris and trash from outlet structure.
- Mow as necessary.
- Monitor for the presence of mosquitos and treat if necessary.
- Check that the sediment elevation/depth measuring device gives an accurate reading. Remove deposited sediment as indicated below:

When the basin depth is reduced by 1/3 of the original depth in the main pond, remove the deposited sediment.

When the basin depth is reduced by 2/3 of the original depth in the forebay, remove the deposited sediment

### Inspections:

After the dry detention basin is established, perform inspections once a quarter and after every storm event greater than 1.0 inch for the first year. Inspections are required annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

## DRY DETENTION BASIN INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
<b>Embankment &amp; Emergency Spillway</b>			
Dead vegetation removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Areas of erosion or under cutting?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Animal burrows, cracks, or slides on embankment?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Emergency spillway obstructed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Drainage area stabilized?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Encroachment into easement area?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Sediment Forebay</b>			
Evidence of sediment accumulation?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Has sediment reached removal depth?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does vegetation need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Dry Pool</b>			
Undesirable vegetation growth?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does dead vegetation, leaves, or debris need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Visible pollution?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Erosion at pipe outfalls into pond?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Headwalls and endwalls in good condition?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does sediment need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Mosquitoes present?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Pond Outlet Structure</b>			
Are all structural components of outlet controls in good condition?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

## DRY DETENTION BASIN INSPECTION CHECKLIST (CONT'D)

Outlet controls functional and free of sediment buildup, trash, & debris?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Outfall channels functional and not eroding?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

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Inspected by: \_\_\_\_\_

## WET DETENTION BASIN MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Wet Detention Basins. Owners must document Wet Detention Basin deficiencies during inspections. Complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

The wet detention basin system is defined as the detention basin, outlet structure, and pretreatment system (if provided).

BMP Name	
BMP Location on Site	
# of Inflow Pipes	
Forebay Present (Yes or No)	
Pond Outlet Type & Location	
Aerator Present (Yes or No)	
Emergency Outfall Location	
Comments	

Required Maintenance:

- Immediately after the wet detention basin is established, water the plants on the vegetated shelf and perimeter of the basin twice weekly, until the plants become established (typically six weeks).
- After initial fertilization to establish vegetation, only fertilize once a year.
- Ensure a stable groundcover is maintained in the drainage area to reduce the sediment load.
- Minimize the flushing of sediment through the emergency drain to the maximum extent practical when draining the wet detention basin for maintenance or emergency activities.
- Mow grass as needed.
- Remove debris and trash from outlet device.
- Re-stabilize banks if erosion occurs.
- Check for the presence of mosquitos and treat if necessary. Inspections:

After the wet detention basin is established, perform inspections once a quarter and after every storm event greater than 1.0 inch for the first year. Inspections are required annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

Ensure the measuring device used to determine the deposited sediment elevation/depth gives an accurate depth reading and does not penetrate into accumulated sediments.

When the basin depth is reduced by 1/3 of the original depth in the main pond, remove the deposited sediment. When the basin depth is reduced by 2/3 of the original depth in the forebay, remove the deposited sediment.

## WET DETENTION BASIN INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
<b>Embankment &amp; Emergency Spillway</b>			
Dead vegetation removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Areas of erosion or under cutting?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Animal burrows, cracks, or slides on embankment?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Emergency spillway obstructed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Encroachment into easement area?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Sediment Forebay</b>			
Evidence of sediment accumulation?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Has sediment reached removal depth?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does vegetation need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Permanent Pool</b>			
Undesirable vegetation growth?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does dead vegetation, leaves, or debris need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Visible pollution?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Erosion at pipe outfalls into pond?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Headwalls and endwalls in good condition?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Aerator working properly?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Does sediment need to be removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
<b>Pond Outlet Structure</b>			
Are all structural components of outlet controls in good condition?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

**WET DETENTION BASIN INSPECTION CHECKLIST (CONT'D)**

Outlet controls functional and free of sediment buildup, trash, & debris?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Outfall channels functional and not eroding?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

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Inspected by: \_\_\_\_\_



## PERMEABLE PAVEMENT MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Permeable Pavement. Owners must document Permeable Pavement deficiencies during inspections. Complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

BMP Name	
BMP Location on Site	
Comments	

### Required Maintenance:

- Maintain a stable groundcover in the drainage area to reduce sediment load.
- Stabilize and mow the area around the perimeter of the permeable pavement and remove clippings.
- Spray weeds that grow in the permeable pavement with herbicide immediately. Do not pull weeds as this could damage the media.
- Clean the Permeable Pavement surface using suction and sweeping (vacuum sweep) or high-pressure wash and suction annually. Sweeping alone without suction is ineffective.
- Do not repair Permeable Pavement surfaces with other types of pavement surfaces. Conduct all repairs to Permeable Pavement surfaces utilizing permeable pavement meeting the original pavement specifications. Ensure any utility cuts adhere to this requirement.
- Avoid sealing or repaving with non-porous materials.
- Ensure concentrated runoff from roof drains, piping, swales or other point sources do not directly discharge to Permeable Pavement surface.
- Inspect the surface for damage, deterioration, and/or spalling. Inspections:

After the installation of Permeable Pavement, perform inspections once a quarter for the first year. Inspections are required annually after the first year. Inspection and maintenance records must be retained and provided to the County upon request.

## PERMEABLE PAVEMENT INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
Paving surface free of debris and sediment?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Adjacent areas stabilized?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is water standing 48-hrs after a 10yr – 24hr storm event?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Access to pervious pavement (egress and ingress routes) safe & adequate?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Pavement area cleaned annually?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Any evidence of clogged pores that require vacuum-sweeping?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is surface deteriorating or spalling?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

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Inspected by: \_\_\_\_\_

## MTD MAINTENANCE AND RESPONSIBILITY AGREEMENT

The *Stormwater Practices Permanent Maintenance Covenants* require adequate maintenance for stormwater management/Best Management Practices (BMP) facilities including Stormwater Manufactured Treatment Devices (MTDs). Owners must document Stormwater MTD deficiencies during inspections and complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functionality.

**Because there are many types of MTDs available, the inspection form and schedule for these must be developed based on manufacturer recommendations. Below is a general guideline, but an appropriate inspection form and schedule must be developed for each MTD during the design process.**

BMP Name	
BMP Location on Site	
Comments	

Important maintenance procedures:

- Inspect and maintain all MTDs in accordance with the manufacturer's written recommendations.
- Prepare specific maintenance requirements and maintenance schedules for each MTD.
- Maintain, and make available to the County, Catalog Cuts of the manufacturer's maintenance recommendations.
- Inspect MTDs at least semi-annually to ensure that the MTD is working properly.
- Maintain MTDs as required to maximize pollutant removal.
- Keep a maintenance log to track all MTD inspections and maintenance with the quantities of materials removed from each MTD. Lack of maintenance is the most common cause of failure for MTDs.
- Remove accumulated sediment and other trapped pollutants when the MTD becomes full. Typical removal of pollutants requires the use of a vacuum truck.
- Ensure proper site stabilization is achieved so MTDs function as designed.
- Do not use MTDs to trap eroded sediment from construction operations, unless the manufacturer has approved such use in writing. If this is the case, the written approval will need to be submitted to the County.
- Install MTDs as the last stormwater runoff structures installed on site, or keep these MTDs off-line or isolated until final stabilization is achieved.

Inspections:

After the installation of Stormwater Manufactured Treatment Devices (MTDs), perform inspections once a quarter for the first year and semi-annually thereafter. Inspection and maintenance records must be retained and provided to the County upon request.

## MTD INSPECTION CHECKLIST

Inspection Date: \_\_\_\_\_ Previous Inspection Date: \_\_\_\_\_

Inspection Items	Inspection Result	Maintenance Needed	Comments/Maintenance Actions Needed
Plant height greater than design ponding depth?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Vegetation overgrown?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Drainage areas around MTD fully stabilized?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is there standing water in the infiltration area 72 hrs after a 10 yr, 24 hr storm event?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Trash & debris removed?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Inlets and outlets unobstructed and free of trash and debris?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is sediment barrier full of sediment?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	
Is the observation well dry after 72 hours of dry weather?	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	

Additional Comments: \_\_\_\_\_

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Inspected by: \_\_\_\_\_

**Appendix F**  
**Enforcement Response Plan (ERP)**

# **Horry County**

## **Enforcement Response Plan**



**October 2014**

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## Introduction

The purpose of this Enforcement Response Plan (ERP) is to provide guidance for identifying types of violations and enforcement responses available to Horry County which can be used to achieve compliance for practices as stated in the Stormwater Management Ordinance (Chapter 17. 7, Article III) and meet the requirements of the SCDHEC Small Municipal Separate Storm Sewer System (SMS4) Permit. The ERP also specifies criteria by which County personnel can determine the enforcement response most appropriate for violations and noncompliance in regards to construction, illicit discharge detection and elimination (IDDE), post construction and good housekeeping. The ERP is designed to achieve the following objectives:

- Prevent pollutants from entering the Municipal Separate Storm Sewer System (MS4) and causing environmental harm.
- Establish definitions for noncompliance.
- Provide equitable and consistent enforcement actions to the extent possible.
- Recover costs incurred by the County due to site operator noncompliance.
- Penalize non-compliant site operators for violations.

Violations can be categorized as either minor or major. The severity of the violation can be based on the duration of the violation, the effect the violation caused on the environment, and whether or not the violator is a repeat offender. These key factors can be used in determining the severity of the violation but the classification is not limited to these only. Minor violations typically have not caused an immediate threat to the environment or SMS4 and most often only require a verbal or written warning. Major violations are assessed when the operator has failed to comply with the stormwater ordinance or has not complied with violation notices, and such negligence has caused an immediate or significant impact on the environment or SMS4. The County may determine the severity of a violation at its discretion.

This plan is intended as a guide to be used by Horry County employees or their designee. Any of the enforcement responses may be used at the County's discretion. The County may alter this document at any time, without prior notice, or pursue an enforcement case by skipping any intermediate steps.

## Enforcement Response Actions

The following are the types of enforcement response actions which may be taken by Horry County. The County reserves the right to apply any enforcement response at their discretion.

- I. **Verbal Warnings:** given at the discretion of the inspector when the violation can be corrected within a reasonable amount of time as determined by the inspector and the violator is contacted and agrees to correct the problem. Verbal warnings should be noted on the inspection report, however, no formal Notice of Violation (NOV) is required. Verbal warnings are to be issued within 24 hours of inspection.



## II. **Written Warnings:**

- a. Notice of Violation (NOV) – must specify the nature of the violation, required corrective action and date of a follow up inspection. Upon receipt of a NOV, the violator should submit a response and a plan for the correction and prevention of the violation conditions in writing within three (3) business days to the Horry County Stormwater Department.
- b. Stop Work Order – applies to active construction sites. Can be issued when a site is determined to be active without proper permits or for failure to respond to a previously issued NOV. May also be issued by the County/inspector if a major violation of the stormwater ordinance or illicit discharge is present that requires immediate action.

Written warnings are to be issued within three (3) business days of inspection.

## III. **Denial of Certificate of Occupancy (CO):**

Upon final inspection of a construction site, if the site is not properly stabilized or the operator has failed to comply with an outstanding notice of violation, then the County inspector may deny the issuance of a Certificate of Occupancy (CO) until final stabilization or compliance has been achieved.

## IV. **Citations (Civil/Criminal Penalties):** The County may impose a monetary penalty (Horry County Code Section 1-8) of no less than fifty dollars (\$50.00) and no more than five hundred dollars (\$500.00). Each day of a violation constitutes a separate violation. Penalties can be assessed based on the following criteria:

1. Severity of impact to public health and/or the environment.
2. Economic benefit gained by the violator.
3. Amount of effort put forth by the violator to correct the violation.
4. Enforcement costs incurred by the County.
5. Recurring violations or repeat violators.

Civil litigation may be used as a response in the following situations:

- Previous efforts have failed to restore compliance.
- The violator fails to pay assessed fines.
- The County determines it needs to recover losses due to the violator's noncompliance.
- It is necessary to stop or prevent activities that threaten human health and/or the environment.

## **Enforcement Response Levels**

Violations can vary and the corrective action taken will be on a case by case basis. The following levels can be used as guidance on determining the best course of action to take for the different types of violations.

Level 1 – Administrative issues with relatively low environmental risk and an infrequent record of violation by the operator should cause the following enforcement sequence: **Verbal Warning -> Notice of Violation -> Stop Work Order -> Citation -> Civil Litigation.**

Level 2 – Record keeping and site conditions that pose a relatively moderate/significant environmental risk to discharge pollutants into the SMS4 or adjacent receiving waterbody should cause the following enforcement sequence: **Verbal or Written Warning -> Notice of Violation -> Denial of Certificate of Occupancy -> Stop Work Order -> Citation -> Civil Litigation.**

Level 3 – Any immediate threat to human health and/or the environment or demonstrated willful noncompliance by an operator should cause the following enforcement sequence: **Stop Work Order -> Citation -> Civil Litigation.**

### **Construction Site Violations**

Table 1 identifies the resulting environmental impact of the violation, whether or not it is a reoccurring offense or offender, whether it has a minor or major environmental impact, and the recommended level of enforcement responses. The recommended enforcement response, as indicated by the levels described above, can be utilized at the discretion of the County or its designee.

**Table 1. Construction Violation Responses**

<b>Result of Violation</b>	<b>Repeat Offense/Offender</b>	<b>Category</b>	<b>Recommended Enforcement Response</b>
Potential for or minimal sediment deposition	No	Minor	Level 1
	Yes	Minor	Level 2
Sediment deposition occurs without impacting sensitive areas	No	Minor	Level 1
	Yes	Major	Level 2
Major sediment deposition or pollutant discharge	No	Major	Level 2
	Yes	Major	Level 3
Construction occurring without a land disturbance permit	No	Major	Level 3
	Yes	Major	Level 3

### **Illicit Discharge Detection and Elimination (IDDE)/Improper Disposal**

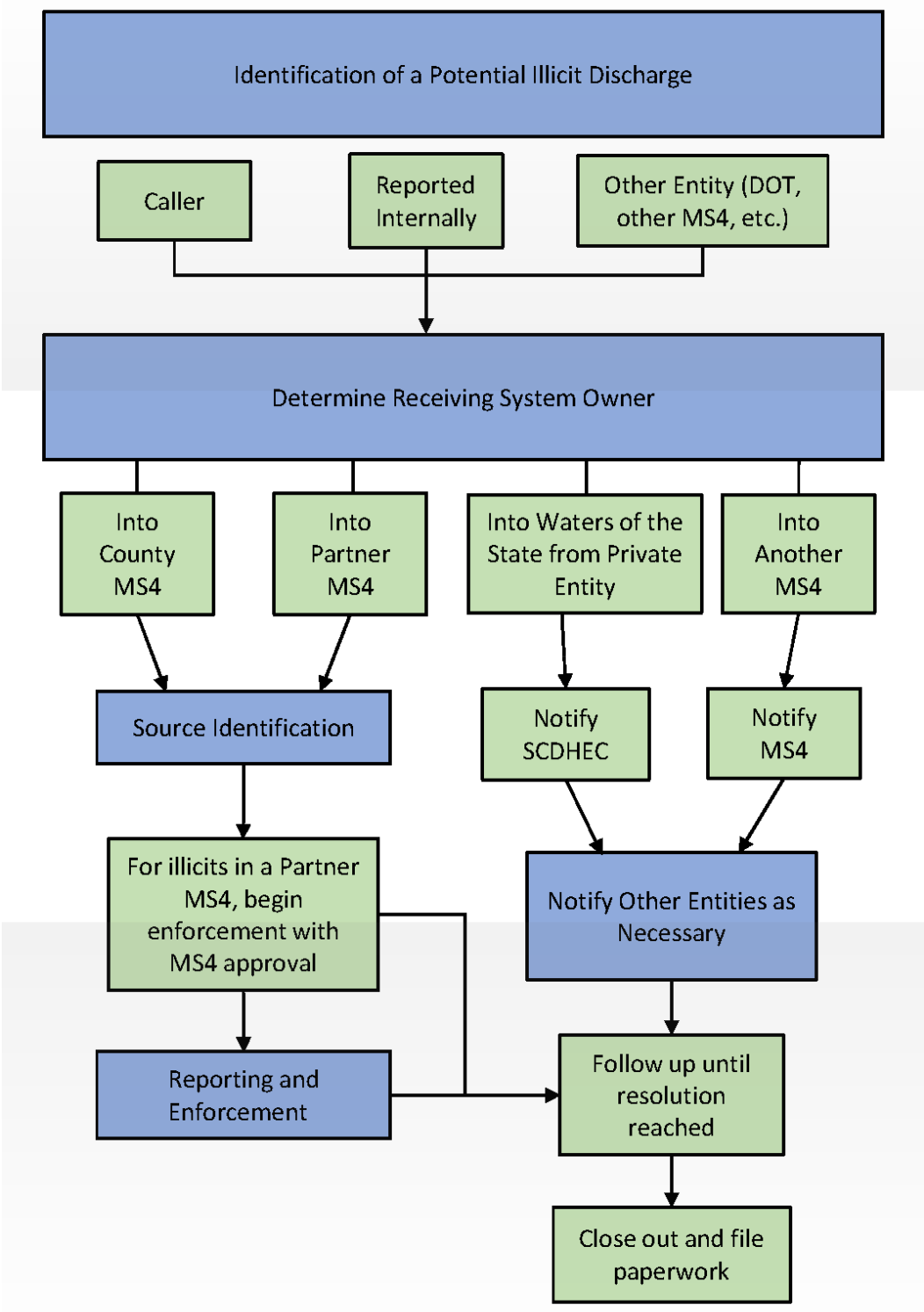
Evidence of an illicit discharge or improper disposal must be reported immediately to the Horry County’s Stormwater Management Department. If the illicit discharge is suspected to be an immediate danger to the health of humans and animals and/or the environment, the County is to immediately contact SCDHEC Emergency Response Section (ERS) at 1-888-481-0125.

The following procedures shall be used when an illicit discharge is discovered:

- If the source of the illicit discharge is evident at the time of inspection, a verbal notice may be issued to the responsible party.
- A NOV or stop work order depending on the severity and nature of the illicit, must be issued within twenty-four (24) hours after the source of the discharge is located. The operator or party responsible for the source of the illicit discharge will be required to eliminate the discharge within five (5) business days of written notification. The County has the option of changing the required elimination time based on the severity of the illicit discharge.
- The County will perform a follow up inspection within ten (10) business days of the initial notification. If the illicit discharge has not been corrected at the time of the follow-up inspection, a second NOV will be issued within twenty-four (24) hours. The operator or responsible party will have three (3) business days from the second NOV to eliminate the illicit discharge.
- A second follow-up inspection will be performed within five (5) days after issuance of the second NOV. If the illicit discharge has not been corrected, the County may proceed with civil action against the operator or responsible party.

Figure 1 represents the steps to be taken for illicit detection or improper disposal. Additional information on the County's IDDE program can be found in the Horry County Standard Operating Procedures for Use in Field Investigations for Illicit Discharges (July 2014).

Figure 1. Illicit Discharge/Improper Disposal Responses



## Post Construction Violations

Horry County requires all developers of new and re-development projects to sign a Maintenance Agreement which designates the developer or designee/owner as the responsible party for maintaining and ensuring the proper function of all post construction BMPs. As per the SCDHEC SMS4 Permit (effective January 1, 2014) the County will be responsible for inspecting all post construction BMPs, permitted by the County after the effective date, at least once during the permit cycle. Following the County's inspection, an inspection report will be generated and sent to the BMP owner.

If no problems are noted during the inspection, then the inspection report will indicate that no "recommended items" or "required items" exist at that time. If minor maintenance issues are discovered during the inspection, then the inspection report will identify "recommended items" and indicate that the owner should take action to address those issues and that the owner is responsible if those issues lead to BMP failure. If major maintenance issues are found during the inspection, then the inspection report will identify "required items" and indicate that the owner must take action to address those issues. Required items are those that directly relate to the safety and primary design function of the BMP, such as but not limited to: excessive woody vegetation on slope of dam/spillway; evidence of burrowing animals; leaks; seepage; or cracks in or major erosion of the dam of a detention pond.

The following levels of enforcement response will apply to post-construction inspections:

Level 1 – Inspection indicates that no recommended or required items exist at this time:  
**Inspection Report**

Level 2 – Inspection indicates that recommended items exist: **Inspection Report -> Verbal Consultation-> Verbal or Written Follow-up**

Level 3 – Inspection indicates that required items exist: **Inspection Report (requests corrective action plan) -> Notice of Violation -> County Corrective Action (costs assessed to owner) -> Civil Litigation**

Table 2 outlines the actions to be taken if a post construction BMP is determined, upon inspection, to have failed or have the potential to fail or cause sediment or pollutants to enter a receiving waterbody, sensitive areas, or the SMS4. The County reserves the right to skip any intermediary steps dependent upon the severity of the environmental impact and/or the duration of the violation.

**Table 2. Post Construction Inspection Responses**

<b>Result of Violation</b>	<b>Category</b>	<b>Recommended Response</b>
Inspection report indicates no recommended or required items	Initial Contact	Level 1
Inspection report indicates recommended items only	Initial Contact	Level 2: Verbal Consultation
	Follow-up Contact	Level 2: Verbal or Written Follow-up
Inspection report indicates required items (may also include recommended items)	Initial Contact	Level 3: Notice of Violation (Corrective action plan requested)
Corrective action to repair required items not taken	Compliance Inspection	Level 3: County Corrective Action; Civil Litigation, if warranted